

 UTC Aerospace Systems			Operating and Maintenance Manual		
			BMA and BBA for Multi-system locomotive ACS64 / Amtrak		
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OPERATING MANUAL

BMA - BBA

Multi-system locomotive ACS64 / Amtrak



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This description will not be systematically updated.

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Project data

Product/machine Fire alarm and fire-fighting system for the
ACS64 multi-system locomotive

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Model range

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ISO 9001:2008
BS OHSAS 18001:2007
ISO 14001:2004

KIDDE-DEUGRA Brandschutzsysteme GmbH
Ist ein Unternehmen mit zertifiziertem
Qualitäts-Management-System

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1. Important basic information

1.1 Scope of supply / List of parts

Depending on the system configuration, the KIDDE-DEUGRA fire alarm and fire-fighting system in the locomotive ACS64 includes the following components.

Item	Quantity per system		Description	Art. No. Kidde Deugra
1	1	Qty.	24V/2/2 control unit	42-22301-020
2	4	Qty.	Thermo switch 120 °C	42-25044-912
3	2	Qty.	Terminating resistor for terminal mounting	42-41002-410
4	2	Qty.	Extinguishing cylinder 10 litre with Novec 1230	42-10016-110
5	2	Qty.	Pressure gauge (fitted to the extinguishing cylinder)	22-42948-034
6	4	Qty.	Bracket for extinguishing cylinder 10 litre	22-42941-253
7	2	Qty.	Hose	42-31031-138
8	2	Qty.	Adapter for hose	42-10465-115
9	4	Qty.	Nozzle M18x1.5	42-34035-018
10	2	Qty.	Pyrotechnic pressurised gas generator	42-53110-240
11	2	Qty.	Wiring harness for pressurised gas generator	42-53110-106
12	2	Qty.	Handle for manual triggering	42-10465-113
13	2	Qty.	Test lamp	42-43009-000

1.2 Interfaces to the overall system

The layout and the connections to the fire alarm and fire-fighting system are shown in the following diagram:

- Terminal diagram 42-51110-620 for control unit 24V/2/2 (Appendix: 15.1)

1.3 Legal information

We refer you to the general terms of business of KIDDE-DEUGRA Brandschutzsysteme GmbH.

Liability, warranty and guarantee claims, except where subject to statutory provisions, are governed by the contractual terms.

1.4 Structure of the operating manual

1.4.1 Index

1. Important basic information
2. Safety
3. Technical Data
4. Layout and operation of the fire alarm and fire-fighting system
5. Transport
6. Storage
7. Erection and connection conditions
8. Installation instructions
9. Operation
10. Commissioning
11. Decommissioning
12. Troubleshooting
13. Maintenance and servicing
14. Deinstallation
15. Appendices

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1.4.2 Presentation methods

Various elements in this operating manual are identified with specific coded markings. This means that you can see straight away which of the following are involved

- a list
 - a list of information
 - 1. a list of operating steps
- or highlighting of important advice.**

1.4.3 Pictograms

The symbols used in this operating manual are above all there to raise awareness of safety instructions. The most important aim involves avoiding personal injury.

The symbol used in each case cannot replace the adjacent text. This means the text must always be read in full.

1.5 Associated documents

Technical drawings and data in the Appendix.

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2. Safety

2.1 Safety indications on the product

All safety and warning instructions on the individual components must be complied with. They must not be removed or modified.

2.2 Safety indications within this manual

The pictograms and safety instructions used in this manual are generally described below. In the following operating, maintenance and installation manuals, you are made aware of the respective hazards in a concrete way.



This symbol indicates possible danger of personal injury or danger to life.



Fire, naked flames and smoking prohibited.



The symbol indicates potential damage to property or the environment.



**General prohibition sign
followed by a text stating the prohibition.**



This symbol is not an indication of a safety instruction, but indicates useful information for the safe handling of the KIDDE-DEUGRA fire-fighting system.



Electrostatic sensitive device (ESD)

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2.3 Basic safety instructions

2.3.1 Safety measures for normal operation

In normal operation (system operational, but no alarm triggered), providing the system is used correctly and for its intended purpose, it poses no hazard to life and limb.

The signal "System On" is delivered to the vehicle management system of the locomotive via potential-free contacts, thereby signalling the operational readiness of the fire alarm and fire-fighting system.

Any faults that arise must be resolved by a trained and authorised specialist before the start of the journey.



- **Caution**

The system is in a state of continual operational readiness. It may be decommissioned only for maintenance and servicing purposes.

- Only appropriately trained and authorised specialists may perform work on the fire alarm and fire-fighting system.
- The personnel must be thoroughly conversant with all hazard sources and servicing measures in accordance with the data in this operating manual.



- Fire, naked flames and smoking are prohibited within locomotives at all times.



- Major heat sources must not be established immediately at or close to the sensor elements (fire alarm return switches).

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2.3.2 Safety measures in the event of fire

If the fire-fighting system is triggered, the valves of the extinguishing cylinders are opened abruptly by means of pyrotechnic pressurised gas generators. The triggering of the pyrotechnic igniter and the release of the extinguishing agent are associated with ignition and emission noises. The fire alarm can be signalled via externally connected visual and acoustic transducers, and shown on the display. If this occurs, keep clam and bring the vehicle to a halt as quickly as possible so that further fire-fighting measures can be taken and the cause of the fire established.

Providing the Novec 1230 extinguishing agent is used for its intended purpose it normally poses no health hazards to personnel.

After breathing it in:

Bring the affected person in fresh air. If they are having difficulty breathing, immediately call a doctor.

After contact with the skin:

Wash the skin the soap and copious water. If symptoms persist, call a doctor.

After contact with the eyes:

Immediately rinse the eyes with copious water. If symptoms persist, consult a doctor.



- Further instructions can be found in the respective safety datasheet.

2.4 Requirements for personnel, duty of care

Qualifications and compliance with the operating manual

Everyone who is assigned to operate the vehicle and also the fire alarm and fire-fighting system must be familiar with this operating manual. The personnel must be thoroughly conversant with all hazard sources and servicing measures in accordance with the data in this operating manual.

Installation, maintenance and servicing work may be performed only by trained competent personnel.

Training courses can be offered for installation, maintenance and operating personnel.

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2.5 Disposal

The user is responsible for handling the operating media in an environmentally responsible way. During all work carried out on the fire alarm and fire-fighting system, compliance with statutory duties for accident avoidance and correct recycling and disposal must be ensured.

2.6 Proper use for the intended purpose

Field of application

The on-board KIDDE-DEUGRA fire alarm and fire-fighting system is intended exclusively for detection of fires in the two static converters of the class ACS64 electric locomotives. The areas that are monitored by the fire alarm system are called static converter 1 and static converter 2.

Manufacturer's responsibility

The KIDDE-DEUGRA fire alarm and fire-fighting system has been designed and built in compliance with the applicable standards and specified requirements. Generally accepted good engineering practice has been applied and adhered to.

This means that the system represents state-of-the-art technology and offers a very high degree of safety.

KIDDE-DEUGRA guarantees the functionality of the fire alarm system- and fire-fighting system subject to compliance with the operation and maintenance conditions set out in this operating manual.

Operator's responsibility

The vehicle operator is responsible for the proper use of the fire alarm and fire-fighting system for its intended purpose and for adherence to the operating conditions laid down in this operating manual. Hazard and safety instructions must be complied with.

Reliable and safe operation of the fire alarm and fire-fighting system presupposes proper transport, proper storage, erection, fitting and installation as well as due care in its use and servicing. The operator of the vehicle is responsible for all personal injuries and damage to property, which arise from the improper use or use other than for the intended purpose.

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The vehicle operator is responsible for the operational safety of the fire alarm and fire-fighting system. In particular he must ensure that

- the specified operating and storage conditions are adhered to.
- the prescribed regular inspection, maintenance and servicing intervals are adhered to.
- a maintenance record is available.
- the fire alarm and fire-fighting system is used only when it is defect-free and in good working condition.
- only qualified, trained and appropriately authorised personnel may operate, maintain and repair the fire alarm and fire-fighting system.
- the operating, maintenance and servicing personnel know the operating manual.
- the personnel are familiar with and adhere to the safety instructions contained in the operating manual.
- all the safety and warning notices attached to the system are legible and have not been removed.

2.7 Operating conditions

The operating conditions of the fire alarm and fire-fighting system can be found in the Technical Data (see section 3)

2.8 Connection conditions

All the required interfaces are specified in the set of drawings (see sections 7 and 15).

2.9 Modification of the equipment

The equipment must not be modified without prior checking and approval by KIDDE-DEUGRA and the responsible licensing office.

2.10 Improper use

Modifications to the operating agents, operating settings, control equipment or installation positions are not permitted and may lead to the fire alarm and fire-fighting system failing to operate and giving false alarms.

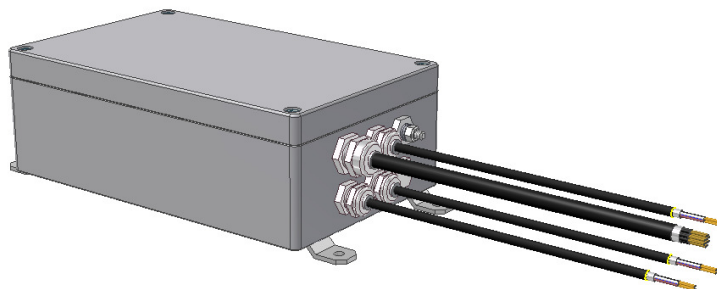
No modifications are permitted to the ventilation and air flow conditions within the fire alarm and extinguishing areas, unless checked and approved by KIDDE-DEUGRA. This particularly applies to structural alterations and changes to the ventilation concept.

Where there is any tampering with the fire alarm and fire-fighting system, which goes beyond the proper operation of the system and use for the intended purpose, all warranty claims cease to be valid.

3. Technical data

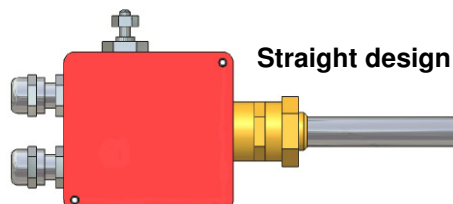
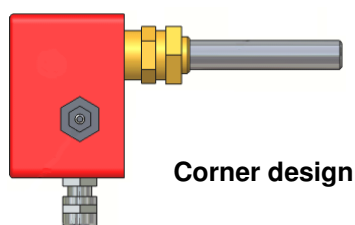
3.1 Technical data - 24/2/2 control unit

Operating voltage:	24 V DC $\pm$ 30%
Quiescent current:	$\leq$ 100 mA at 24 V
Peak current:	For a short time 2 A at triggering (gas generator)
Configuration:	1 x housing for control unit 24V (42-22198-911) 2 x triggering circuit board MA1-1-24V (42-51300-184)
Inputs:	2 notification lines on the principle of current amplification 2 triggering lines
Potential-free outputs:	Fault, notification line (A + B) Fault, triggering line (A + B) Alarm, notification line (A + B) Loss of pressure, extinguishing cylinder (A + B) – not active 1 x signal system operational
Additional functions:	- "Reset" (resetting the alarm message when the memory function of the alarm message has been activated) - optional - "Test function" (testing the alarm and fault message)
Loading capacity of the potential-free outputs:	1 A (25W) at 24 V DC
Time delay:	30 seconds $\pm$ 10%
LED displays on a printed circuit board:	1 x fault notification line (yellow) 1 x pressure loss (yellow) – not active 1 x alarm message (red) 1 x triggering (red) 1 x fault triggering line (yellow)
Operating temperature:	-30 °C to +71 °C
Storage temperature:	-30 °C to +71 °C (6 hours -40 °C)
Dimensions (L x W x H) in mm:	310 x 160 x 99
Connection:	3 x M16x1.5 cable gland (for screened cables) 1 x M20x1.5 cable gland (for screened cables)
Weight:	approx. 3,4 kg
Protection class:	IP 64 tested to DIN EN 60529
Electromagnetic compatibility:	Interference immunity according EN 50155 Interference emissions according EN 55011 class A, group 1
Environmental testing:	According EN 50155
Related drawings:	Control unit 24/2/2: 42-22301-020(M) Housing for control unit 24V: 42-22198-911(M) Terminal diagram: 42-51110-620



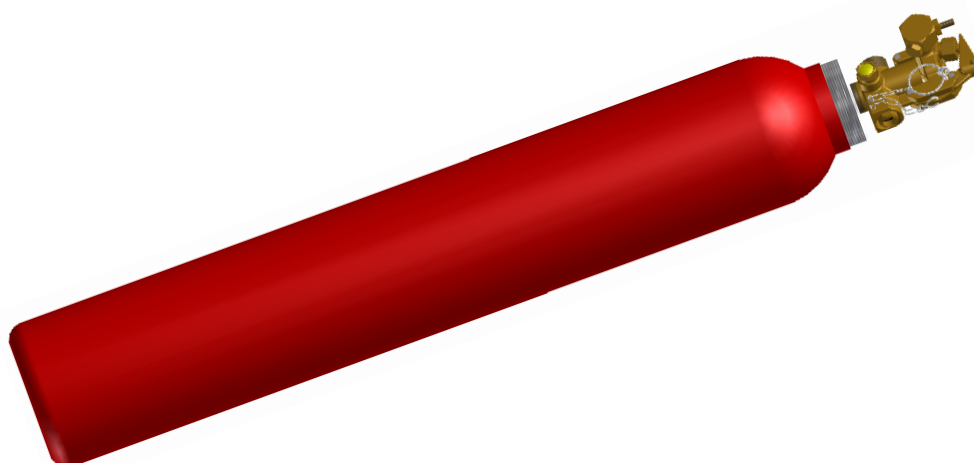
3.2 Technical data, Thermo Switch

Detector type:	Heat detector		
Detector principle:	Normally Open Contact		
Design:	Straight or corner		
Max. current load:	10 A at 24 V AC		
Setting the switching temperature:	Factory set, not adjustable		
Maximum alarm temperature:	Adjustable up to +250 °C		
Ambient temperature of sensor:	-50 °C to +250 °C		
Ambient temperature of housing:	-40 °C to +105 °C		
Air humidity/Degree of protection:	0 - 95 % short term up to 100 % (VDE 0115/T108) / IP 66		
Weight - detector with housing:	660 g		
Housing dimensions H x W x D:	80 mm, 75 mm, 57 mm		
Detector with thread, length projecting from the wall:	95 mm		
Diameter for wall fitment:	22 mm		
Max. wall thickness:	10 mm		
<u>Length along with housing</u>			
Straight design:	215 mm		
Corner type:	166 mm		
Detector length:	75 mm		
Detector diameter:	16 mm		
Connection:	Cable gland M16x1.5		
Electromagnetic compatibility:	Interference immunity according EN 50155 Interference emissions according EN 55011 class A, group 1		
Environmental testing:	According EN 50155		
Drawings:	42-25044-800(M), 42-25044-900(M)		
Fixed temperature range:	<u>corner:</u>		<u>straight:</u>
	42-25044-800	← - flexible temperature - - →	42-25044-900
	42-25044-807	←----- 70 °C -----→	42-25044-907
	42-25044-810	←----- 100 °C -----→	42-25044-910
	42-25044-811	←----- 110 °C -----→	42-25044-911
	42-25044-812	←----- 120 °C -----→	42-25044-912
	42-25044-813	←----- 130 °C -----→	42-25044-913
	42-25044-814	←----- 140 °C -----→	42-25044-914
	42-25044-816	←----- 160 °C -----→	42-25044-916
	42-25044-818	←----- 180 °C -----→	42-25044-918
	42-25044-820	←----- 200 °C -----→	42-25044-920



3.3 Technical Data, extinguishing cylinder 10 litre

Dimensions, complete with cylinder cap:	Ø147 x 965 mm
Contents by volume:	10 litre ± 1 litre
Weight complete, empty:	13 kg ± 2 kg
Material:	Cylinder / 34CrMo4 Valve / CuZn40Pb2 (brass)
Extinguishing agent:	Novec™ 1230
Filled weight:	6 kg ± 0.1 kg
Maximum filling pressure:	42 bar at 20 °C
Cylinder pressure, gauge:	Maximum 200 bar
Cylinder pressure, test:	300 bar
Valve test pressure:	150 bar (rupture disc 190 bar)
Permissible ambient temperatures:	-50 °C to +70 °C (cylinder without valve) -30 °C to +80 °C (only valve) -30 °C to +70 °C (cylinder with valve complete)
Local rapid change in air temperature:	3 K / second maximum change 40 K
Permissible storage temperature:	-30 °C to +71 °C
Relative humidity (storage):	0 – 95 %
Standards / directives complied with (cylinder):	Cylinders satisfy the Transportable Pressure Vessel Directive 2010/35/EC (TPED) Valve satisfy the Pressure Vessel Directive 97/23/EC
Standards / directives complied with (valve):	BAM approval in accordance with EN 849:2001 CE mark CE-0589
Environmental testing:	According EN 50155
Article number:	42-10016-110



3.4 Technical Data for the pressurized gas generator

Designation:	Pyrotechnic pressurized gas generator	
Field of application:	Triggering element for extinguishing cylinder valves	
Function:	A pyrotechnic unit is ignited by electrical activation of a detonator in the pressurised gas generator. The gas pressure generated is used for activation of a triggering cylinder.	
Performance (1cm ³ at 20 °C):	90 ± 30 bar (within 50 ms)	
Ignition current:	800 mA / 10 ms (DC)	
Ignition pulse:	3 mJ / Ω	
Bridge resistance:	1.4 – 1.7 Ω	
Ignition delay period:	< 10 ms with 1 A	
Electrostatic stability:	Voltage < 25 kV Capacitance < 500 pF / 5 kΩ	
Attachment thread:	G 1/8	
Tightening torque:	10 Nm	
Weight:	42-53110-200 / 85 g 42-53110-240 / 92 g	
Weight of the explosive mass:	0.05 g	
Operating temperature:	- 30 °C to + 71 °C	
Storage temperature:	- 30 °C to + 60 °C (store dry)	
Working life:	max. 3 years	
UN number:	0432	
Approval class:	P1 (old designation T1)	
Hazard classification:	1.4 S	
Approval:	BAM PT1-0250	
Drawings:	42-53110-200(M) 42-53110-240(M)	Pressurised gas generator, 240 mm long Pressurised gas generator, 400 mm long



Fig.: Identification sleeve
pressurised gas generator

Article no. & date of manufacture



Note:

- The pyrotechnic pressurised gas generator must be replaced every 2 years (working life max. 3 years / Refer to Fig. 'Pressurized gas generator identification sleeve').

4. Layout and operation of the fire fighting system

4.1 System description

This description applies to the system permanently installed in the ACS64 locomotives for detecting and fighting fires in the static converters. It does not apply to the hand-operated fire extinguisher which is also on board.

The permanently installed fire alarm and fire-fighting system is intended to detect and fight fires in the static converters. Novec 1230 is used as the extinguishing agent. If the temperature in the machine room rises as a result of a fire, the thermo switches report the fire when they reach their set triggering temperature of 120 °C. The fire alarm signal is processed in the 24/2/2 control unit. After a delay period of 30 seconds the fire-fighting system for the respective static converter is triggered. At the same time as the alarm message, an externally connected acoustic transducer can be activated and the fire alarm shown on the display. In addition the fire-fighting system can be triggered electrically by manual operation of the emergency handle that is linked to the fire alarm circuit. The fire alarm is stored in the 24/2/2 control unit until the fire-fighting system is switched off.

When the extinguishing cylinder is triggered, a gas concentration sufficient to extinguish fires is created and maintained for an appropriate time in the areas to be protected. The extinguishing agent leaves no residues of any kind. The gas concentration that is created is not hazardous to humans.

The entire fire fighting system is operational as soon as the battery main switch and the MCB for the fire alarm and fire-fighting system are switched on. The signal "System On" is reported accordingly. From this point on the thermo switches and the triggering circuits are continually monitored for short circuits and open circuits. All operating states are reported to the vehicle management unit by means of potential-free contacts.



- The fire alarm and fire-fighting system remains operational even when the driver's cab is unoccupied.
- The manual trigger switch is not included in the KIDDE-DEUGRA scope of supply!

4.2 System components

4.2.1 24/2/2 control unit

The 24/2/2 control unit is used in the ACS64 locomotive to process fire detection signals and to fight fires by triggering the extinguishing cylinder. The control unit has a total of two notification lines available, which can be used to trigger two extinguishing cylinders.

The current version of the control unit is equipped with 4 connection cables, with each fire extinguishing area having a separate cable tail for the notification line and triggering line (e.g. static converter 1 is assigned connection cables notification line 1 and triggering line 1). The 2 notification lines operate independently of each other, and each notification line triggers the extinguishing cylinder for the respective area, once a delay of 30 seconds has elapsed after the fire alarm.

Fire detection is performed by thermo switches which trigger the alarm in response to an impermissible rise in temperature (120 °C).

Provided the on-board voltage is available at the 24/2/2 control unit, the "System On" signal is automatically reported to the vehicle management unit. The system is then operational.

The 24/2/2 control unit monitors the functionality of the overall system, and any faults that occur are reported. This ensures that the functionality of the overall system is maintained. The fault messages report the following faults:

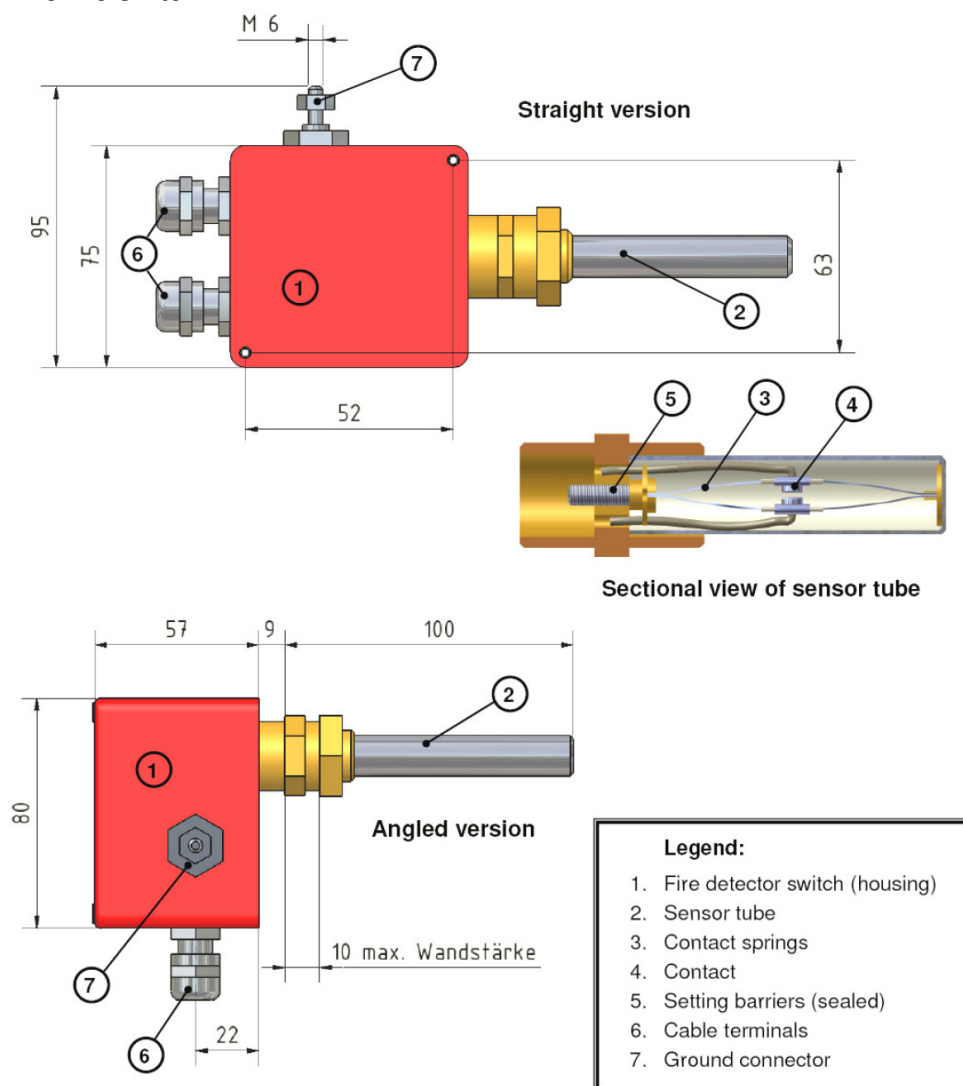
- short circuit in one line
- open circuit
- Removal / theft of a detector or extinguishing cylinder
- Defect in the system
- Triggering of a extinguishing cylinder

The "Test System" input offers the facility for the driver to perform a system test, which tests all the externally connected visual and acoustic display devices.

The following messages are made available to the vehicle management unit via potential-free contacts:

Operational readiness	Fault message		Alarm
"System ON"	Fault in fire alarm line 1	Fault in triggering line 1	Fire in power converter 1
	Fault in fire alarm line 2	Fault in triggering line 2	Fire in power converter 2

4.2.2 Thermo switch



The thermo switch (1) comprises an aluminium housing with terminal block, to which the heat-sensitive, fire-resistant stainless steel sensor tube (2) is fixed. Inside the sensor tube (2), two pre-tensioned contact springs (3) are attached anchored to the front faces of the tube.

Temperature rises in the sensor tube (2) lead to different expansions in length contact system, to distortion and thus to closure of the contact springs (3) and the electrical contact (4) inside the sensor tube (2). This means the connected electrical circuit is closed and the evaluation unit receives the alarm signal.

The trigger point (temperature set point) is preset via a sealed adjustment screw (5) and calibrated (at the factory).

Activation of the thermo switch (1) causes the closure of a connected electrical circuit or triggering of the control unit. Once the temperature has dropped below the set point, the contact springs open and the electrical circuit is opened again.

The entire fire alarm line is continually monitored for open circuits, short circuits and fire alarm on the principle of current amplification in a range of **4.1 mA**. For this purpose a **10 k Ω** terminating resistor is used to terminate the notification line, and a **390 Ω** alarm resistance is fitted in each thermo switch. The control unit continually monitors any change in the resistance by the various operating states.

A resistance between ∞ and **approx. 20 k Ω** is evaluated as an open circuit notification line and a fault message is reported. A resistance between **approx. 18 k Ω** and **approx. 700 Ω** is evaluated as the normal working range of the fire alarm line. A resistance between **approx. 520 Ω** and **approx. 110 Ω** is evaluated as a fire alarm. A resistance between approx. **100 Ω** and **0 Ω** is evaluated as a **short circuit** and a fault message is reported. This continual evaluation permits reliable monitoring.

If in the event of fire the thermo switch closes the circuit, the notification line is terminated with **390 Ω** , the current in the notification line increases and is then within the set alarm range. The fire alarm is flagged at the potential-free output and the respective extinguishing cylinder is triggered. In this way a NO relay can reliably detect the fire alarm and the system is reliably monitored.

4.2.3 Extinguishing Cylinder

The 2 extinguishing cylinder are each bolted into a special bracket with the release valve facing upwards. They are each filled with 6 kg Novec 1230 at a pressure of 42 bar. The extinguishing pipework system is connected to the quick-opening valve by means of a hydraulic hose.

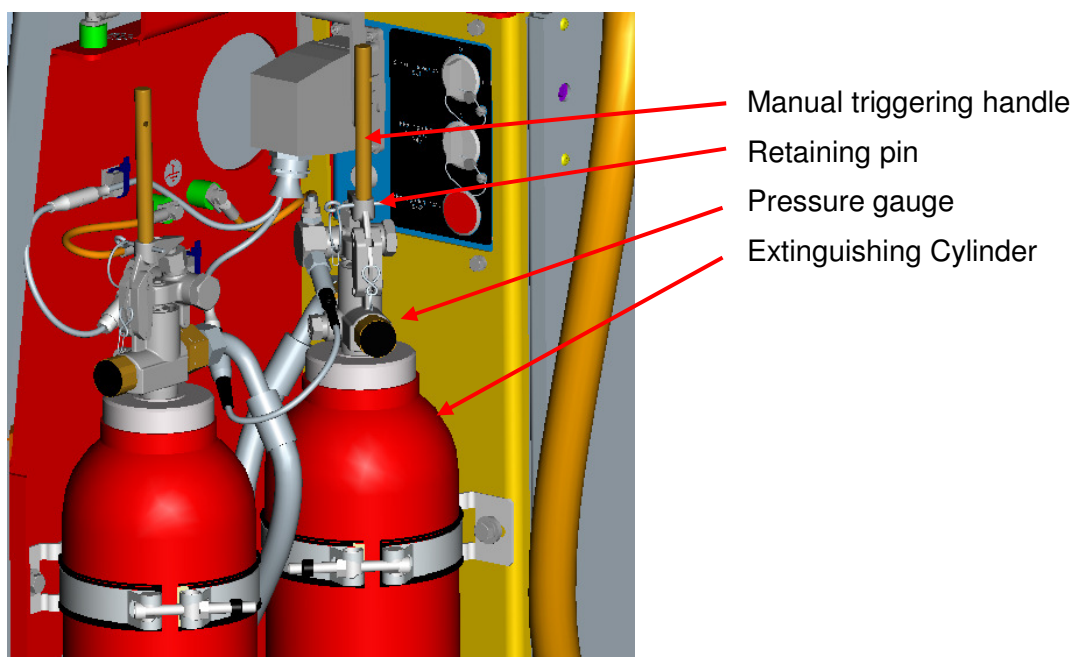


Fig.: Extinguishing cylinder

For manual triggering, the handle must be plugged in to the lever group and the handle secured with the retaining pin. A pressure gauge is provided for visual checking of the pressure.

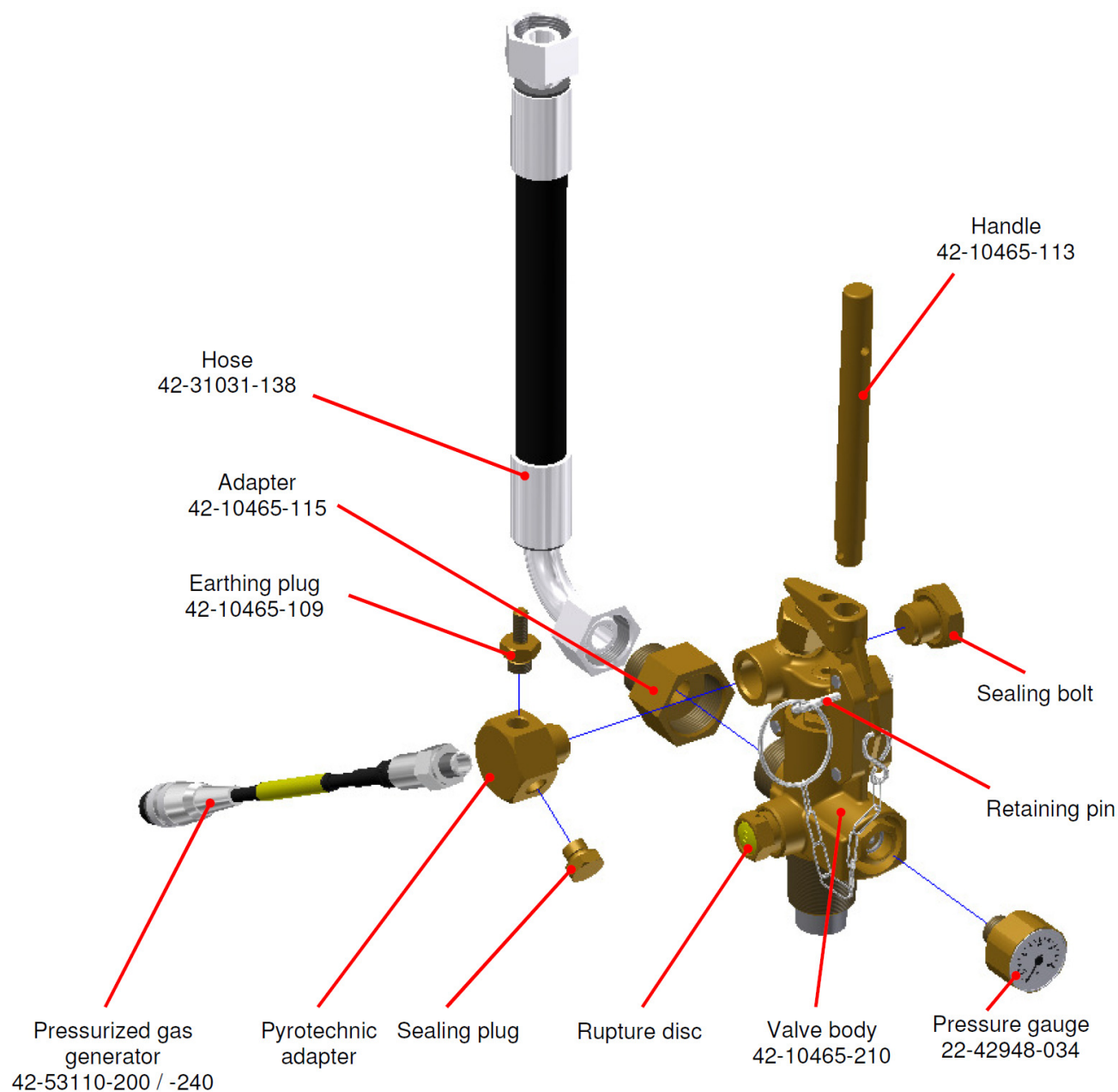


Fig.: Layout of the valve

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4.2.4 Pyrotechnic pressurized gas generator

The pyrotechnic adapter is located on the extinguishing cylinder valve, above the discharge opening. The pyrotechnic pressurized gas generator is screwed into this and is connected to the control unit cable by means of a plug. If a rise in temperature (fire) exceeds the set point of a thermo switch, the circuit in the alarm area closes. The control unit closes the ignition circuit and after 30 seconds the pressurised gas generator actuates the lever group and the valve opens. This allows the extinguishing agent to be discharged at 42 bar from the extinguishing cylinder 1 or 2 into the extinguishing agent pipework for the static converter 1 or 2.



Note:

- The pyrotechnic pressurised gas generator must be replaced every 2 years (working life max. 3 years / Refer to the pressurised gas generator identification sleeve).

4.2.5 Extinguishing agent pipework

The pipework is routed from the extinguishing cylinders to the areas where the fire is to be fought. At that point it divides into nozzles attached to the pipework. This ensures that the extinguishing agent is released through holes directly at the seat of the fire, thus fighting it.

The hose from the extinguishing cylinder valve to the pipework system, and also the nozzles, are part of the KIDDE-DEUGRA scope of supply. The pipework system itself is not part of the KIDDE-DEUGRA scope of supply.



Note:

- After it has been installed for 6 years, the hose must be replaced (Refer Fig. 'Information stamped on the hose').

4.2.6 Nozzles

Two nozzles are installed per static converter. Each nozzle has 8 holes, through which the Novec 1230 extinguishing agent is delivered under pressure. At the ambient temperature of more than 120 °C expected in the case of fire it is in a gaseous state.

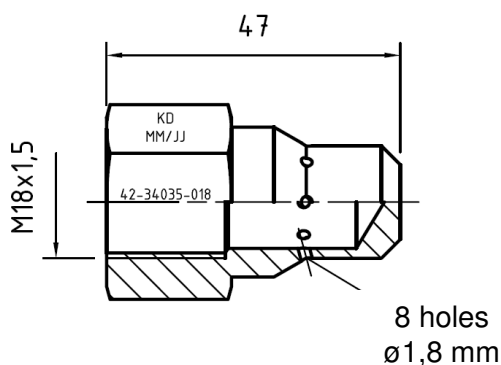


Fig.: Nozzle

5. Transport

Transport should generally be performed using approved packaging.

The use of special transport and storage containers is recommended, since these provide optimum protection for the extinguishing cylinders.

The general safety instructions must be complied with.

Warning!



- The 24/2/2 control unit is an electrostatic sensitive device (ESD). Appropriate measures (potential equalisation) must be taken for protection of this component when handling it.

5.1 Extinguishing Cylinder



- Extinguishing cylinders may only be transported when safeguarded. The retaining pin must be inserted into the lever group. The transport cap and the protection cap must be fitted over the valve outlet.
- Check new extinguishing cylinders for damage in transport.



- Extinguishing cylinders are hazardous materials containers as per UN no. 1066. The relevant safety directives are to be adhered to during handling and transport.
- Provided it is suitably repackaged, the extinguishing cylinder can be declared as a fire extinguisher to UN no. 1044.



- Before the extinguishing cylinder is transported, the pressurised gas generator must be removed. See section 14 for deinstallation instructions.

5.2 Pyrotechnic pressurized gas generator



Explosive substances hazard

- Pyrotechnic pressurised gas generators are hazardous goods to UN no. 0432. Improper use and storage can lead to injuries.

- UN number: 0432
- Technical name: Pyrotechnic cartridge for technical purposes
- Hazard class: P1 (old designation T1)
- Hazard classification: 1.4S
- Capability certificate requirement: no

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6. Storage

6.1 Special safety instructions for storage



- Extinguishers may be stored only when secured. The retaining pin must be inserted into the lever group. The transport cap and the protection cap must be fitted over the valve outlet.
- Store extinguishing cylinders under clean and dry conditions, with access for maintenance.



- Extinguishing cylinders are pressurised. The relevant safety directives must be complied with when handling pressure vessels.
- Extinguishing cylinders must be stored upright and secured.
- Do not store extinguishing cylinders in direct sunlight or close to heat sources.



Explosive substances hazard

- The pyrotechnic pressurised gas generators for fitting to the extinguishing cylinders are hazardous goods to UN no. 0432. Improper use and storage can lead to injuries.



Compliance with storage conditions

- The user is responsible for compliance with storage conditions.



- Various components are marked with their date of manufacture. Once their usability period has expired these components must be replaced or subjected to a thorough overhaul. The usability periods for individual components can be found in their Technical Data.

6.2 Electronic components

All electrically operated devices are classed as electronic components. To avoid damage, the following storage conditions must be complied with:

- Store components in their original packaging.
- Store components under clean, dry and cool conditions.
- Store components in atmospheres free of corrosive vapours.
- permissible storage temperature – 30 °C to + 71 °C.
- max. change in temperature / hour 20 °C sinusoidal.

6.3 Extinguishing Cylinder

The following storage conditions for extinguishing cylinders must be complied with:

- Store components in their original packaging.
- Storage only with the retaining pin inserted, protective cap and transport cap fitted.
- Storage only with the pyrotechnic pressurised gas generator removed
- Store extinguishing cylinders under clean, dry and cool conditions.
- Protect from direct sunlight and other effects of heat.
- Storage in a non-corrosive atmosphere.
- Make sure there is sufficient ventilation in the storage areas.
- Permissible ambient temperatures: - 30 °C to + 71 °C.
- Maximum change in temperature / 1 hour 20 °C sinusoidal

6.4 Pyrotechnic pressurized gas generator

- Store components in their original packaging.
- Store components under clean, dry and cool conditions.
- Store components in atmospheres free of corrosive vapours.
- permissible storage temperature – 54 °C to + 71 °C.
- Storage group: 1.4
- Compatibility group: S

6.5 Long-term protection

No special measures are required by KIDDE-DEUGRA.

7. Erection and connection conditions

7.1 Ambient conditions

The storage and operating conditions specified sections 3 and 6 must be complied with.

7.2 Space required

The dimensions of the individual components can be found in the Technical Data sheets (section 3).

7.3 Installation positions

The installation positions are specified by the vehicle designer in consultation with KIDDE-DEUGRA, and are checked and accepted at a prototype model stage and installation trials.

The specified installation positions must be complied with. Changes to the system are permissible only in consultation with KIDDE-DEUGRA.



- If changes are made, they must be consistent with official acceptance and approval.

7.4 Interfaces to the overall system

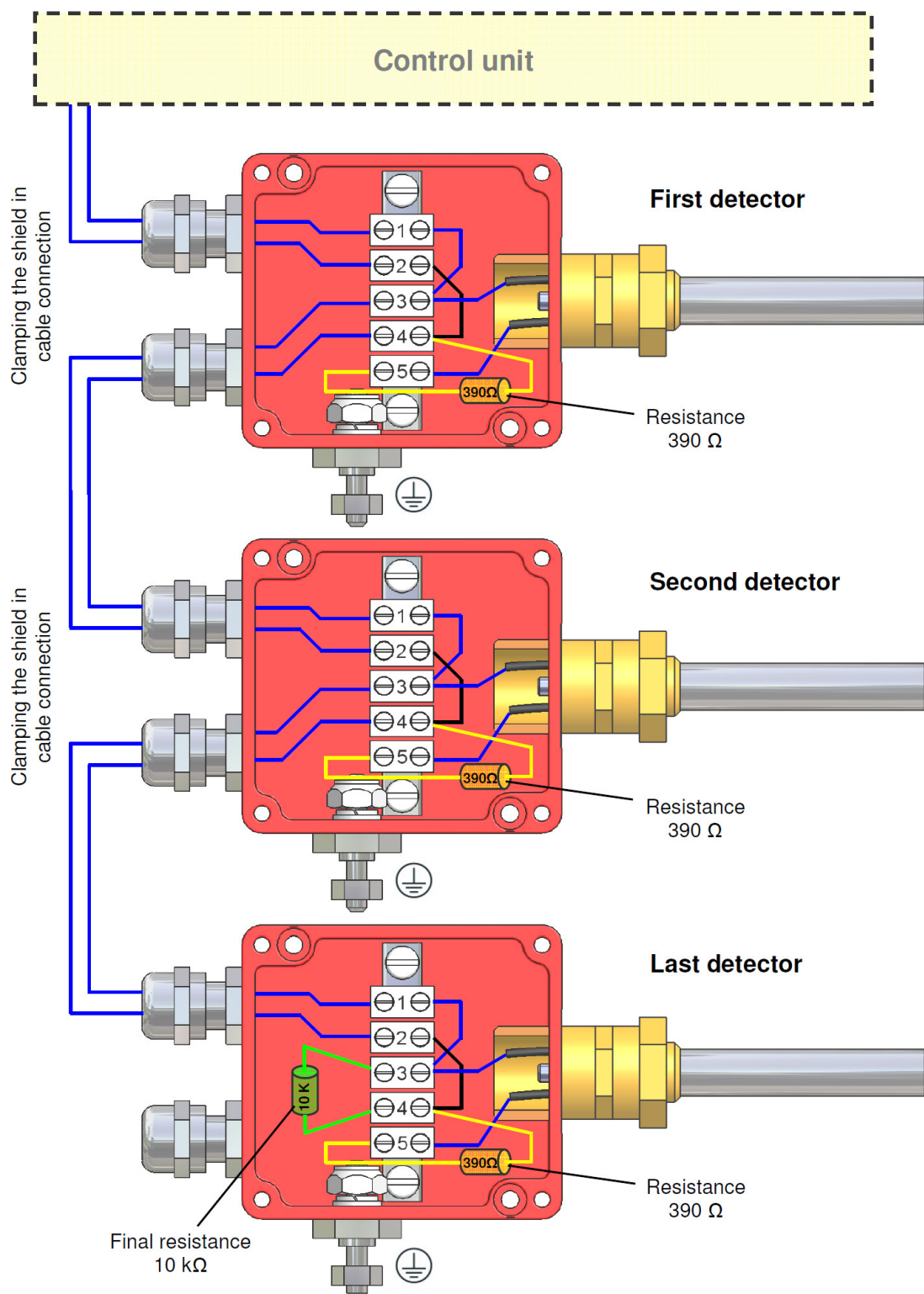
7.4.1 Electrical and mechanical interfaces

The electrical connections to the 24/2/2 control unit are defined in the following drawing:

- Terminal diagram for the control unit 24/2/2 drawing no. 42-51110-620

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7.4.2 Electrical connection for the thermo switch



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8. Installation instructions

8.1 Special safety instructions for installation



- Comply with the general safety instructions (section 2).
- After completion of installation, perform commissioning (section 10).



Warning!

- Ensure that the system is voltage-free during all installation work on the fire alarm and fire-fighting system!



Explosive substances hazard

- The pyrotechnic pressurized gas generators for fitting to the extinguishing cylinders are hazardous goods to UN no. 0432. Improper use can lead to injuries.



Warning!

- The 24/2/2 control unit is an electrostatic sensitive device (ESD). Appropriate measures (potential equalisation) must be taken for protection of this component when handling it.

8.1.1 Thermo switches

The thermo switches are installed in the area to be protected. The electrical connection of the cable is performed at terminals 1 and 2. The alarm resistance of 390 Ω is connected between terminals 4 and 5. The earth connection (M6) on the outside of the housing must be connected to the vehicle earth. The screen of the electrical cables must be properly connected to the EMC cable glands.

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8.2 Installation instructions for control unit 24/2/2

The control unit 24/2/2 is screwed through the holes to the mounting rails. The earth connection is performed via the external earth strap. The connections for the power supply, notification lines, triggering lines and potential-free contacts are performed via the four labelled connection cables. The screen of the electrical cables must be laid correctly.

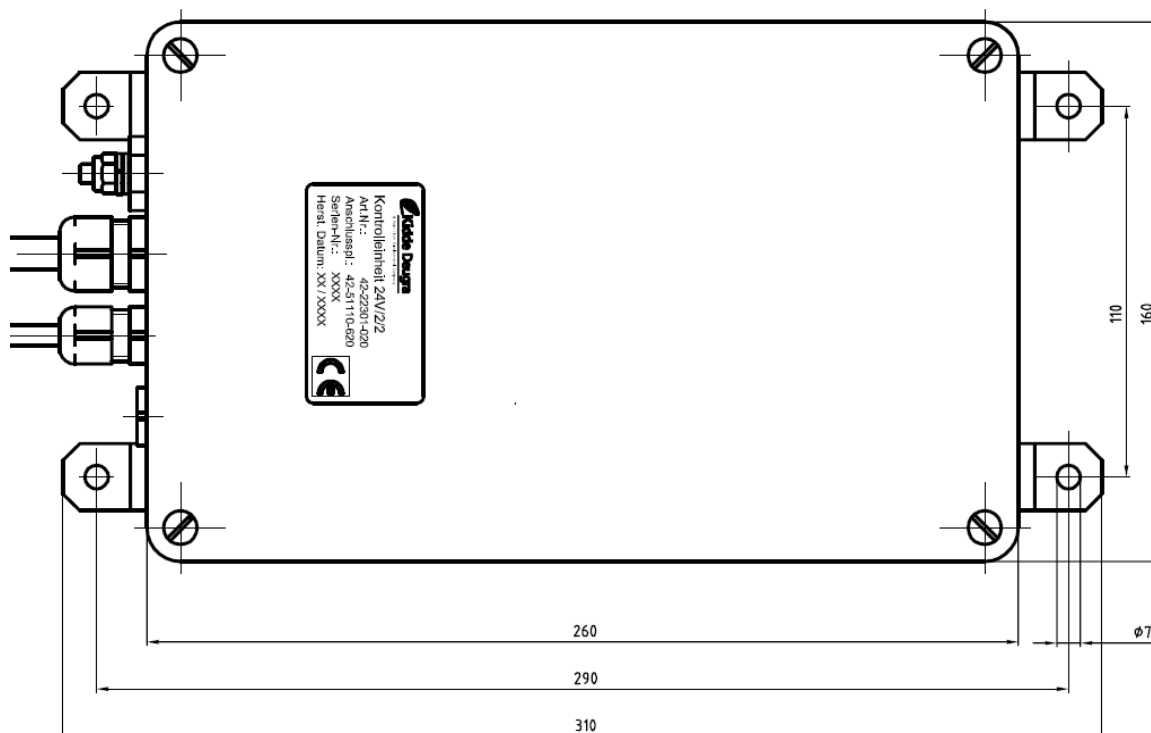


Fig.: Control unit and connections



- Comply with the general safety instructions (section 2).
- After completion of installation, perform commissioning (section 10).

Warning!



- Ensure that the system is voltage-free during all installation work on the fire alarm and fire-fighting system!

Warning!

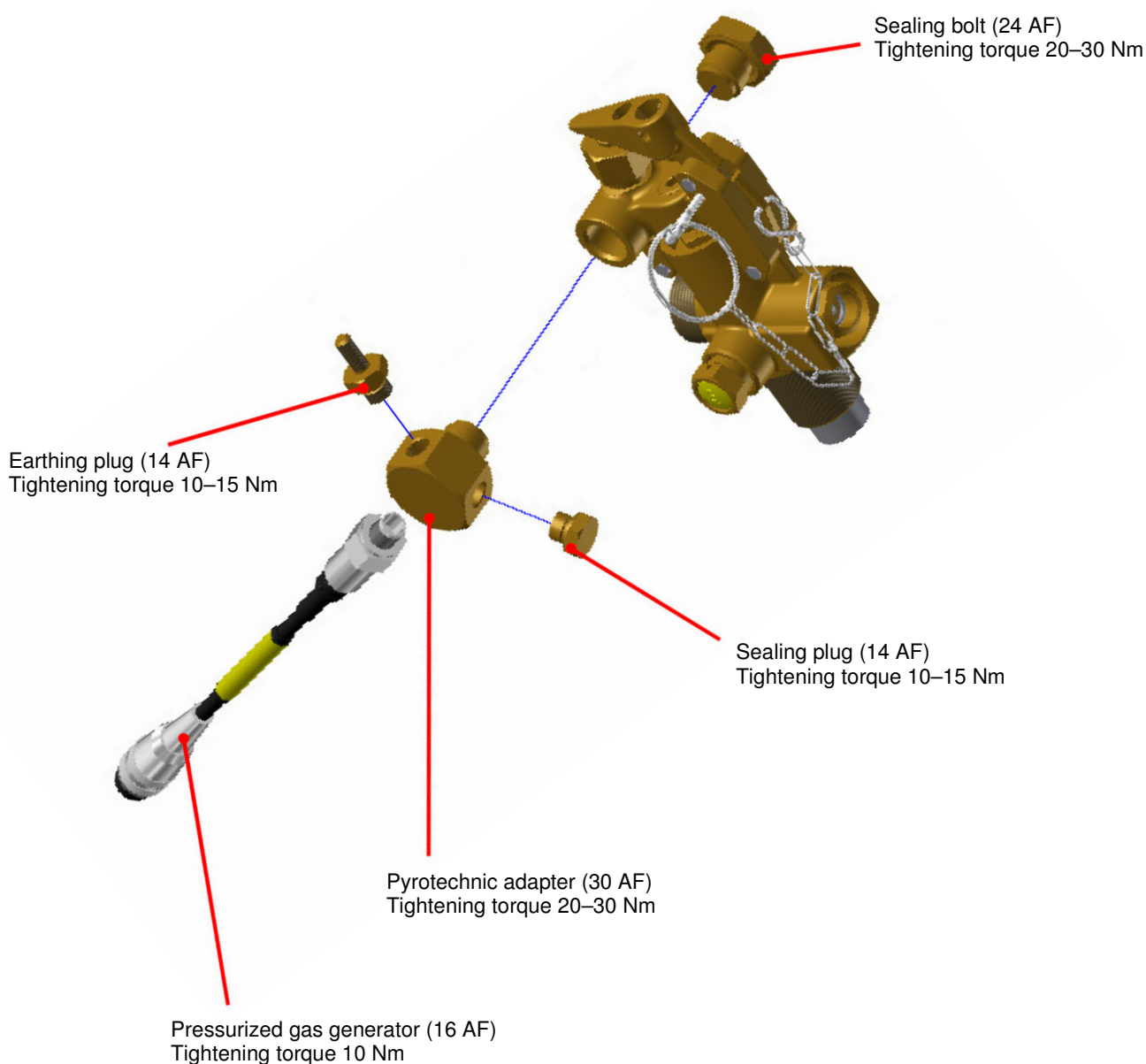


- The 24/2/2 control unit is an electrostatic sensitive device (ESD). Appropriate measures (potential equalisation) must be taken for protection of this component when handling it.

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8.3 Installation instructions for the pyrotechnic pressurized gas generator

The pyrotechnic pressurized gas generator is screwed into the pyrotechnic adapter including the copper sealing ring supplied. Before connecting the pressurized gas generator to the triggering line, make sure that this line is at zero potential and that no alarm message is present.



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**Warning!**

- Avoid direct contact with naked flames.
- Use only for the specified purpose.
- Always first disconnect the power supply when fitting and removing it.
- Never connect it to a power supply when it is not screwed into its operating position. Risk of recoil!
- Exposure to major electrostatic discharge (more than 25 kV) may cause it to detonate.
- Do not use in the vicinity of strong electric fields.
- Do not heat to more than 71 °C, and do not attempt to force it open. Risk of detonation!
- If it detonates there is always the risk that parts may fly off forwards, therefore never point it at anyone!



- Installation may be performed only by a suitably trained specialist.

**Warning!**

- Ensure that the system is voltage-free during all work on the fire alarm and fire-fighting system!

**Note:**

- The pressurised gas generator must be replaced every 2 years (working life max. 3 years / Refer to the pressurised gas generator identification sleeve).

**Warning!**

- The pressurised gas generator is an electrostatic sensitive device (ESD). Voltage discharges >25 kV can activate the pressurized gas generator.

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8.4 Installation instructions extinguishers

Before it is finally fixed in the bracket, the 10 litre extinguishing cylinder must be equipped with the attachment parts supplied. When doing this, the installation state of the extinguishing cylinder and the respective placing of the adapters and glands supplied must be considered.

The additional parts are fitted to the extinguishing cylinder as follows.

1. Secure the extinguishing cylinder in the bracket so that is held upright.
2. Undo the four fixing screws (Torx T25), then remove the transport protection cap.
3. Unscrew the protective cap and screw on the hose adapter (20 to 30 Nm).
4. Screw the hose on to the hose adapter (tightening torque 50 Nm).
5. Screw the pyrotechnic pressurised gas generator on to the pyrotechnic adapter (tightening torque 10 Nm). The other two openings on the adapter are supplied already plugged with the sealing plug and earthing plug. If required the pressurised gas generator can be swapped for either of these two plugs (tightening torque for sealing plug and earthing plug 8-12 Nm).
6. Tighten the screws on the extinguishing cylinder bracket. The pressure gauge must be aligned so that it can easily be read.
7. Prime the valve group by removing the retaining pin from its hole.
8. Fit the operating handle to the valve and secure it with the valve retaining pin (the retaining pin must be sealed).
9. Seal the valve using the retaining pin hole in the lever group.
10. Connect the pressurized gas generator to the wiring harness (check that the triggering line is at zero potential).



- The extinguishing cylinder can be triggered by careless handling whilst the operating handle is being fitted.

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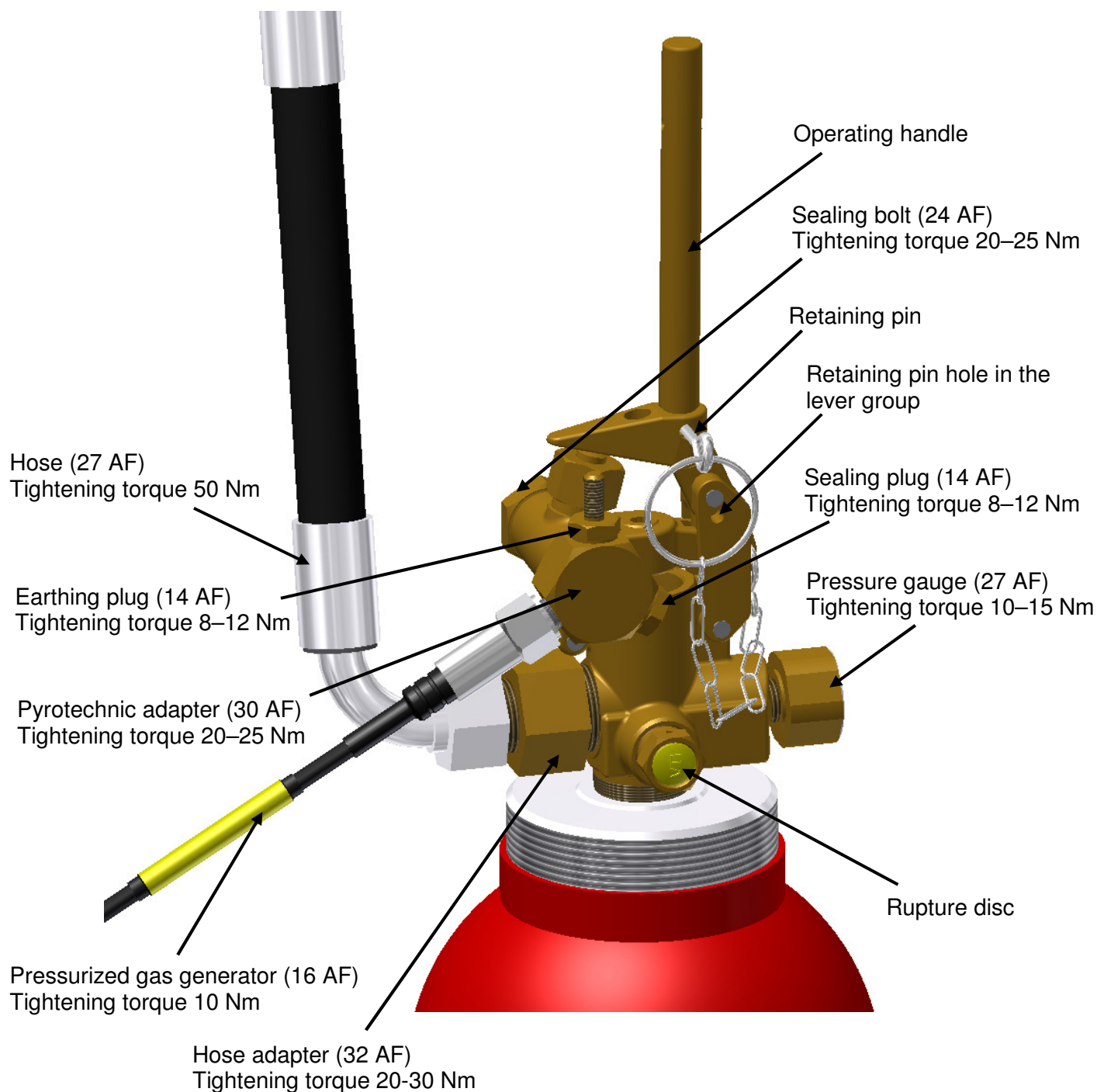
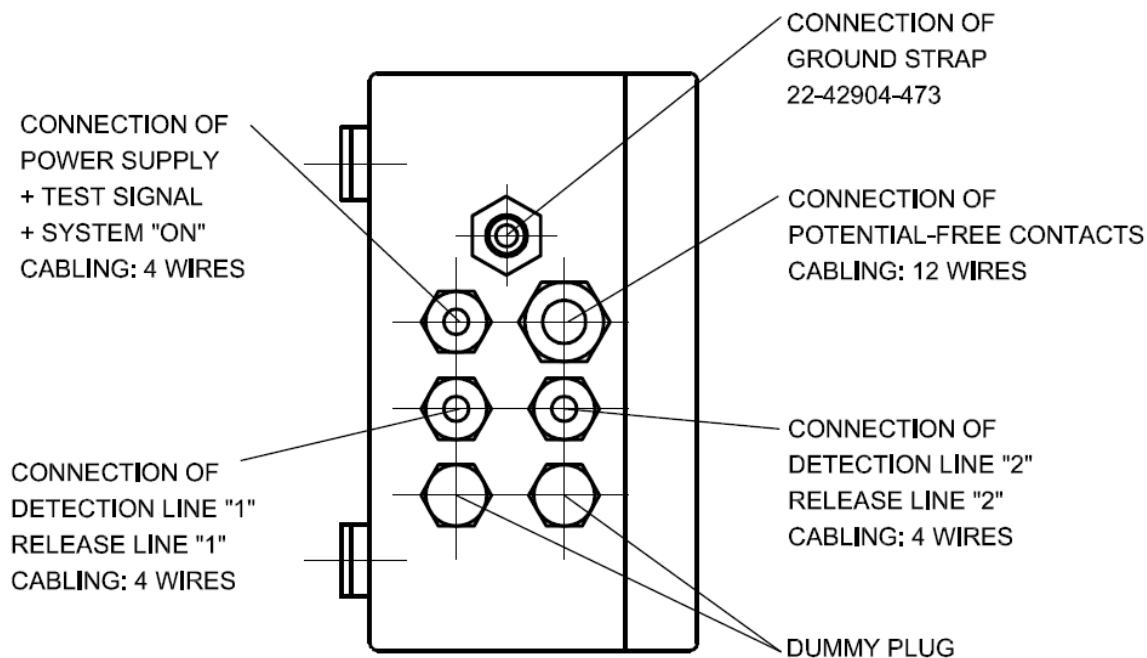


Fig.: Extinguishing cylinder valve with attached parts

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9. Operation

9.1 Arrangement of the control elements and external connections



All status and fault messages are made available to an external management system via potential-free relay outputs.

The control unit makes the following messages / outputs available as potential-free contacts:

- Alarm notification line 1
- Alarm notification line 2
- Fault message notification line 1
- Fault message notification line 2
- Fault message extinguishing cylinder 1
- Fault message extinguishing cylinder 2
- Control unit switched on

A 24 V DC contact input is provided at the control unit for lamp and function testing of the external display unit and testing all the relay contacts

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9.2 Operating modes

9.2.1 Normal mode

Conditions:

- Control unit connected to the power supply "System On".
- There are no fault messages from the control unit to the external management system.



- If all the all preconditions are satisfied, the system is operational.

9.2.2 Fire alarm

- If a fire occurs in the described areas of the locomotive, the fire-fighting system triggers automatically.
- Fire-fighting in the static converter areas can also be triggered manually by the manual trigger switch.



- After the system is triggered, the message "Fault extinguishing cylinder 1 or 2" is reported to the external management system, because the pressurised gas generator has been triggered.

9.2.3 Test function "Lamps / relays test"

The contact input "Test-BBA" on the control unit allows the potential-free contacts at the control unit to be tested by activating the associated relays. At the same time the operation of the external signals connected in the driver's cab are checked for correct operation.



- The "Lamps / relays test" must be performed before the start of the journey.

9.2.4 Test function during normal operation

The following checks are performed automatically during normal operation:

- Checking for short circuits in the notification lines and triggering lines
- Checking for open circuits in the notification lines and triggering lines
- Checking for shorts to earth in the notification lines and triggering lines



- If an open circuit, short circuit or short to earth is detected, the appropriate messages are sent by the potential-free contacts in the control unit to the external management system.

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10. Commissioning

Special safety instructions for first commissioning



- Commissioning may be performed only by a suitably trained specialist.
- Comply with the general safety instructions (section 2).
- The commissioning checks performed are similar to those listed in section 13 for maintenance and servicing.



Explosive substances hazard

- The pyrotechnic pressurized gas generators for fitting to the extinguishing cylinders are hazardous goods to UN no. 0432. Improper use and storage can lead to injuries.



Warning!

- The operating voltage for the control unit is 24 V. Do not touch live parts.

1. Check the system for completeness.
2. Check all screw fastenings and tighten them if required.
3. Check all earth conductors and connections. The screen must be connected to earth at both the start and end of the notification line. To prevent EMC problems, the screens must be continued over all the detectors.
4. Connect test lamps in place of the extinguishing cylinders.
5. Switch on the on-board voltage.



- When the on-board voltage is switched on, the message "System On" must be reported.

6. Check the message "System On" in the driver's cabs.
7. Continue performing checks similar to those listed in section 13.4 "Checking the fire alarm and fire-fighting system".
8. Generate a commissioning report on the basis of the checks that were performed.

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11. Decommissioning



- When the operating voltage is switched on, the system is in a state of continuous operational readiness. Decommissioning is permissible only for maintenance and servicing purposes.
- Decommissioning may be performed only by a suitably trained specialist.
- Comply with the general safety instructions (section 2).



Explosive substances hazard

- The pyrotechnic pressurized gas generators for fitting to the extinguishing cylinders are hazardous goods to UN no. 0432. Improper use and storage can lead to injuries.



Warning!

- The operating voltage for the control unit is 24 V. Do not touch live parts.

1. Switch off the on-board power supply
2. Check for zero potential.

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12. Troubleshooting and status messages

12.1 Special safety instructions

Warning!



- Electrical connections of the fire alarm and fire-fighting system may be disconnected only when they are at zero potential!



Explosive substances hazard

- The pyrotechnic pressurized gas generators for fitting to the extinguishing cylinders are hazardous goods to UN no. 0432. Improper use and storage can lead to injuries.

12.2 Causes and remedies

12.2.1 Faults in notification line 1 and 2

The display of a fault message "Notification line 1 and 2" can have the following causes:

Cause	Remedy
Short circuit in the wiring	Check the wiring
Open circuit	Check the wiring
Defective detector	Replace the detector
Defect in the wiring	Check the wiring
Short to earth	Check the wiring
Defect in the control unit	Replace the control unit
Terminating resistor missing / defective	Fit / replace the terminating resistor

12.2.2 Faults in triggering line 1 and 2

The display of a fault message "Triggering line 1 and 2" can have the following causes:

Cause	Remedy
The extinguisher has triggered	Replace the extinguishing cylinder and pressurised gas generator
Pressurized gas generator defective	Replace the pressurized gas generator
Defect in the control unit	Replace the control unit
Open circuit	Check the wiring
Short circuit	Check the wiring
Short to earth	Check the wiring

Before starting work on the fire-fighting system for the ACS64 locomotive, it is essential to ensure that no inadvertent triggering of the fire-fighting system will be caused, i.e.:

- Disconnect the power supply to the control unit.
- Unscrew the cabling to the extinguishing cylinder.
- Connect test lamps article no.: 42-43009-000 to the cables.
- Reconnect the power supply to the control unit.
- After performing the work, check whether voltage is present at the cable to the extinguishing cylinder (the test lamp must not light up).
- After the check shows that the test lamp does not light up, disconnect the test lamps from the cables and reconnect the extinguishing cylinder.

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13. Maintenance and servicing

13.1 General safety instructions

Maintenance and servicing measures must only be carried out by KIDDE-DEUGRA Brandschutzsysteme GmbH's specialist staff or by appropriately trained and authorised specialist personnel.

This does not apply to the regular checks which are prescribed or recommended in the operating manual for the fire alarm and fire-fighting system.



Measures for repair work

- Comply with the general safety instructions (section 2).
- Comply with the installation instructions (section 8) and commissioning instructions (section 10).



Warning!

- The control unit operating voltage is 24V. Do not touch live parts.
- Ensure that the system is voltage-free during all work on the fire alarm and fire-fighting system!



Explosive substances hazard

- The pyrotechnic pressurized gas generators for fitting to the extinguishing cylinders are hazardous goods to UN no. 0432. Improper use and storage can lead to injuries.



- Maintenance and servicing may be performed only by a suitably trained specialist.

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13.2 Check intervals

Interval	Entry into the logbook for operation and checks on the vehicle	KD instructions
When activating the locomotive daily	No	- Check the operational readiness of the fire alarm and fire-fighting system and perform the system test
"Inspection" monthly	No	- Check that the system is complete - Check all screw fastenings - Read the pressure gauges on all the extinguishing cylinders (filling pressure 42 bar at 20 °C)
annually	Yes	- Check and test all components as described below (section 13.3 and 13.4) - Check the detectors and clean them if required - Check the operation of the control unit - Check all screw fastenings and retighten if required - Read the pressure gauges on all extinguishing cylinders, weigh the extinguishing cylinders (filling pressure 42 bar at 20 °C)
every 2 years	Yes	- as above - additionally: Replace the pyrotechnic pressurised gas generators (working life: max. 3 years / refer to Fig. "Pressurized gas generator identification sleeve")
every 5 years	Yes	- as above - additionally: Replace the hoses on the extinguishing cylinders (working life: max. 6 years / refer to Fig. "Information stamped on the hose")
every 10 years	Yes	- as for the annual check - additionally: Overhaul the extinguishing cylinder (refer to Fig. "Information stamped on the extinguishing cylinder").

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13.3 Check the notification lines and pressurized gas generator circuits

Before checking the notification lines and pressurized gas generator circuits, the inspector should perform the following operations:

1. Check the control unit 24/2/2 is at zero potential
2. Disconnect the electrical cable from the pressurized gas generator on the extinguishing cylinder
3. Plug the test lamp (article no.:42-43009-000) into the extinguishing cylinder cable
4. Reconnect the power supply to the control unit 24/2/2

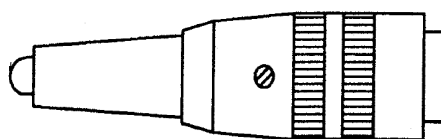


Fig.: Test lamp

13.3.1 Checking the notification lines 1 and 2 for short circuits and open circuits

While the system is in operation, the notification lines 1 and 2 are continually checked by the control unit for short circuits and open circuits. To test this function of the control unit, the inspector should perform the following operations:

1. Open the cover of a detector for the line to be tested.
2. Attach a bridging jumper as a short circuit across the two incoming lines.
3. Look at the display in the driver's cab: it must show "Fault line 1 or 2".
4. Remove the bridging jumper from the detector. (removing the test short circuit)
5. Disconnect the notification line to be tested at any point.
6. Look at the display in the driver's cab: it must show "Fault line 1 or 2".
7. Reconnect the notification line.
8. Close the cover of the detector again.



- This test must be performed on both notification lines.
- Then the notification lines must be correctly reconnected and all the cable connections checked for secure connection.

13.3.2 Checking the notification lines 1 and 2 for shorts to earth

To test the notification lines for shorts to earth, the inspector should perform the following operations:

1. Short circuit the notification line to be tested.
2. Using a suitable tester, test the Isolation against earth (tester max. 500 V and 5 mA).
3. The measured value must be at least 10 MΩ.
4. Restore the notification line to its original condition.



- This test must be performed on both notification lines.
- Then the notification lines must be correctly reconnected and all the cable connections checked for secure connection.

13.3.3 Checking the pressurized gas generator circuits 1 and 2 for shorts to earth

To test the pressurised gas generator circuits for open circuits, the inspector should perform the following operations:

1. Remove the test lamp (article no.:42-43009-000) from the extinguishing cylinder cable
2. Look at the display in the driver's cab: it must show "Fault extinguishing cylinder 1 or 2".
3. Plug the test lamp (article no.:42-43009-000) into the extinguishing cylinder cable
4. The fault messages in the driver's cabs must clear down.



- This test must be performed for all pressurized gas generator circuits.

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13.3.4 Check the detectors for correct operation

To test the detectors for correct operation, the inspector should perform the following operations:

1. Plug the test lamp (article no.:42-43009-000) into the extinguishing cylinder cable
2. Use a hot air gun or gas burner to heat up the sensor tube of one of the thermo switches until it reaches the switching temperature.
3. Look at the display in the driver's cab: it must show "Fire alarm static converter 1 or 2".
4. After 30 seconds, the associated test lamp (article no.:42-43009-000) on the extinguishing cylinder 1 or 2 must light up.



- This test must be performed for all detectors.

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13.4 Checking the system components

13.4.1 24/2/2 control unit

Interval: when activating the locomotive

When the vehicle power supply is switched on, the signal "System On" appears at the potential-free outputs. If this does not happen, the 24 V DC on-board voltage is missing (fuse 10 A on the trigger card in the control unit is defective or the cable for the power supply is open circuit). If this is not checked by the vehicle software, the vehicle driver must check that the power supply is present at the control unit and that no fault message is displayed.

The control unit automatically performs continuous monitoring of the individual assemblies.

Interval: annually

See also checking the notification lines and pressurized gas generator circuits (section 13.3).

13.4.2 Thermo switch (heat sensor) 120 °C

Interval: annually

See also checking the notification lines and pressurized gas generator circuits (section 13.3).

13.4.3 Extinguishing Cylinder

Interval: each month

- Check whether the extinguishing cylinder has been emptied by being triggered.
To do this, the pressure gauge on the valve of the extinguishing cylinder must be read. The internal pressure of the extinguishing cylinder is displayed at the pressure gauge (42 bar at 20 °C). If the cylinder has been triggered it will read 0 bar. Furthermore the seal at the retaining pin hole is broken if the lever group for the extinguishing cylinder valve has been activated.
- Check whether the extinguishing cylinder has lost pressure.
This check is to establish whether nitrogen has leaked from the cylinders and whether the pressure gauge is operating correctly. The rated pressure of the extinguishing cylinder is 42 bar (20 °C). At lower temperatures, the pressure of the nitrogen filling is lower.



Note:

- If the cylinder is stored for a long period at very low temperatures and becomes chilled through, as a rule it takes quite some time at 20 °C to restore the 42 bar.

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Interval: annually

Disconnect the extinguishing cylinder from the extinguishing pipework system, and screw the closure cap on to the hose connection port. Remove the operating handle and secure the lever group of the valve by inserting the retaining pin into the retaining pin hole. Unscrew the pressurized gas generator, take out the cylinder and check the overall weight to the following criteria.

When determining the weight, remember that the extinguishing cylinder was weighed at the factory without operating handle, cylinder closure cap and pressurised gas generator. The overall weight must not deviate by more than 100g from the overall weight printed on the cylinder. Greater variations in weight can arise if too many or too few attachments are fitted to the valve when the weighing is performed.

Clean the extinguishing cylinder of dirt. Replace damaged extinguishing cylinders immediately.

Reinstall the extinguishing cylinder, connect the extinguishing pipework system, check the extinguishing cylinder and bracket for secure attachment.



Note:

- At intervals of no more than 10 years the extinguishing cylinders must be completely overhauled (refer to the information stamped on the extinguishing cylinder).

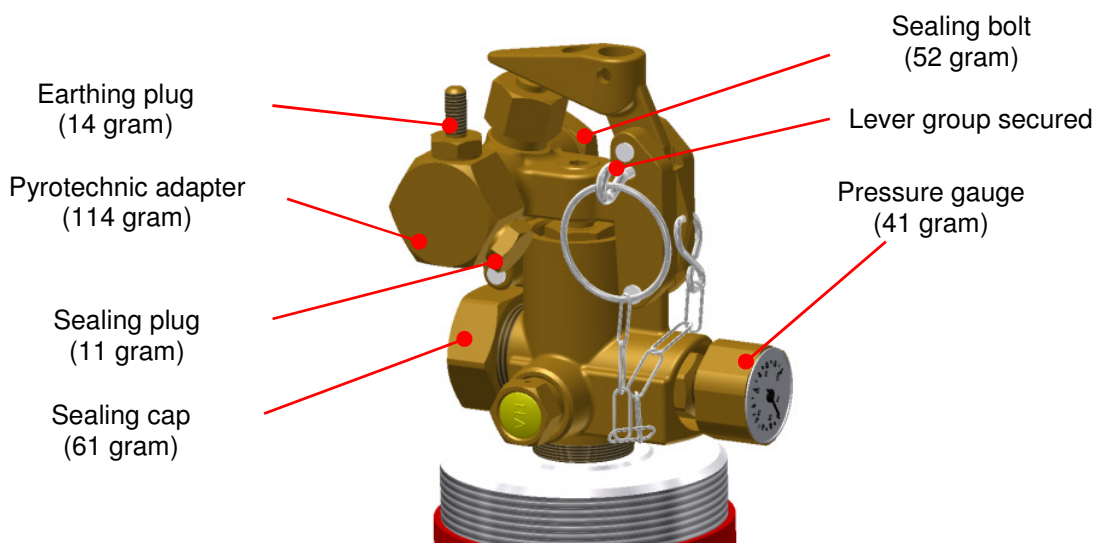


Fig.: Extinguishing cylinder prepared for weighing, and the weights of the attachment parts



Note:

- The drawing above shows the valve assembly prepared for weighing. The operating handle (112 g), hose adapter (111 g) and cylinder closure cap (338 g) are not weighed.

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13.4.4 Pyrotechnic pressurized gas generator

Interval: every 2 years

See checking the notification lines and pressurized gas generator circuits (section 13.3).



Note:

- The pyrotechnic pressurized gas generator must be replaced every 2 years (working life max. 3 years / Refer to Fig. 'Pressurized gas generator identification sleeve').

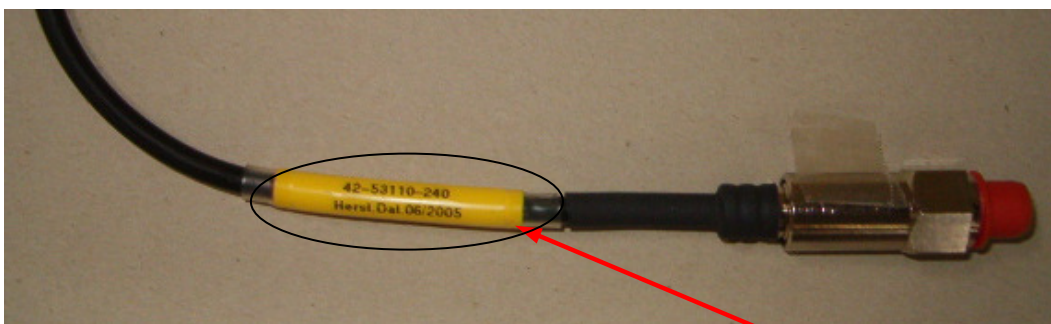


Figure: Pressurized gas generator identification sleeve

Article no. & date of manufacture

13.4.5 Extinguishing pipework system

Interval: annually

Disconnect the extinguishing pipework system from the flexible hose connection and blow it through with compressed air of at least 5 bar.

Check all screwed joints in the pipework, tighten them as required.

Check all pipework clips, tighten them as required.

All hoses must be checked for embrittlement and loss of flexibility. The hoses must be replaced as required.

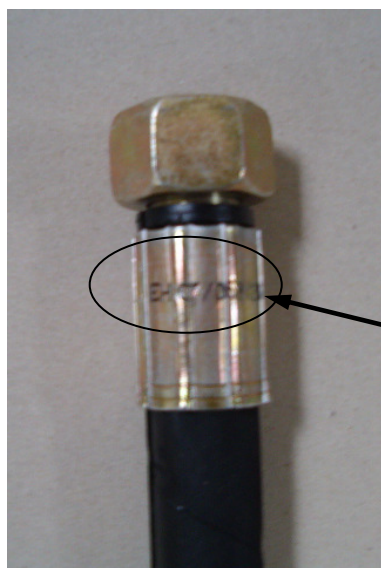
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Interval: every 5 years

Check the hose at the extinguishing cylinder valve for embrittlement and loss of flexibility. Replace the hoses as required.

Recommendation:


- After no later than 6 years, the hoses and seals must be renewed (refer Fig. 'Information stamped on the hose').



Date of manufacture month / year & test pressure
250 bar

Figure: Information stamped on the hose

13.5 Maintenance record

The prescribed maintenance and inspection intervals must be complied with. The user is responsible for carrying out the maintenance work and providing proof of it.

13.6 Inspection and maintenance schedules

Inspection and maintenance schedules must be created by the user of the vehicle. The prescribed maintenance of the fire alarm and fire-fighting system can be performed during the course of the regular vehicle inspections.

13.7 Servicing work

The servicing of the fire alarm and fire-fighting system consists essentially of the detection of any causes of defects, and the replacement of defective components. Only the manufacturer may undertake the repair of components.

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14. Deinstallation

14.1 General advice

Deinstallation of the permanently-mounted fire alarm and fire-fighting system is not envisaged. However individual components of the system may be deinstalled by competent personnel for servicing purposes. The following safety instructions must be complied with.

14.2 Special safety instructions



Comply with the general safety instructions (section 2).

Warning!



- Ensure that the system is voltage-free during all deinstallation work on the fire alarm and fire-fighting system!
- The 24/2/2 control unit operating voltage is 24V. Do not touch live parts.

Explosive substances hazard



- The pyrotechnic pressurized gas generators for fitting to the extinguishing cylinders are hazardous goods to UN no. 0432. Improper use and storage can lead to injuries.



- Deinstallation may be performed only by a suitably trained specialist.



Warning!

- The 24/2/2 control unit is an electrostatic sensitive device (ESD). Appropriate measures (potential equalisation) must be taken for protection of this component when handling it.

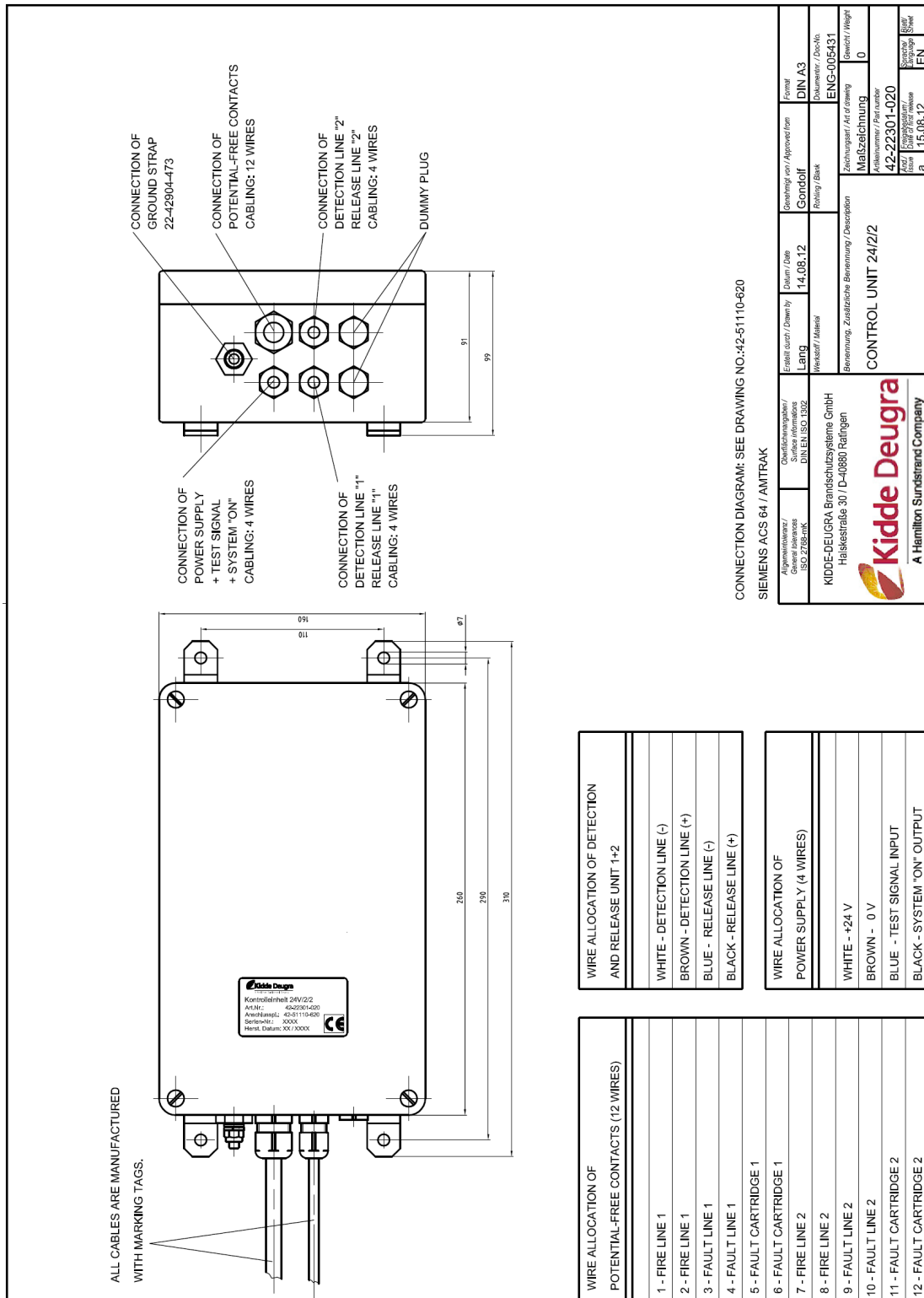
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15. Appendix

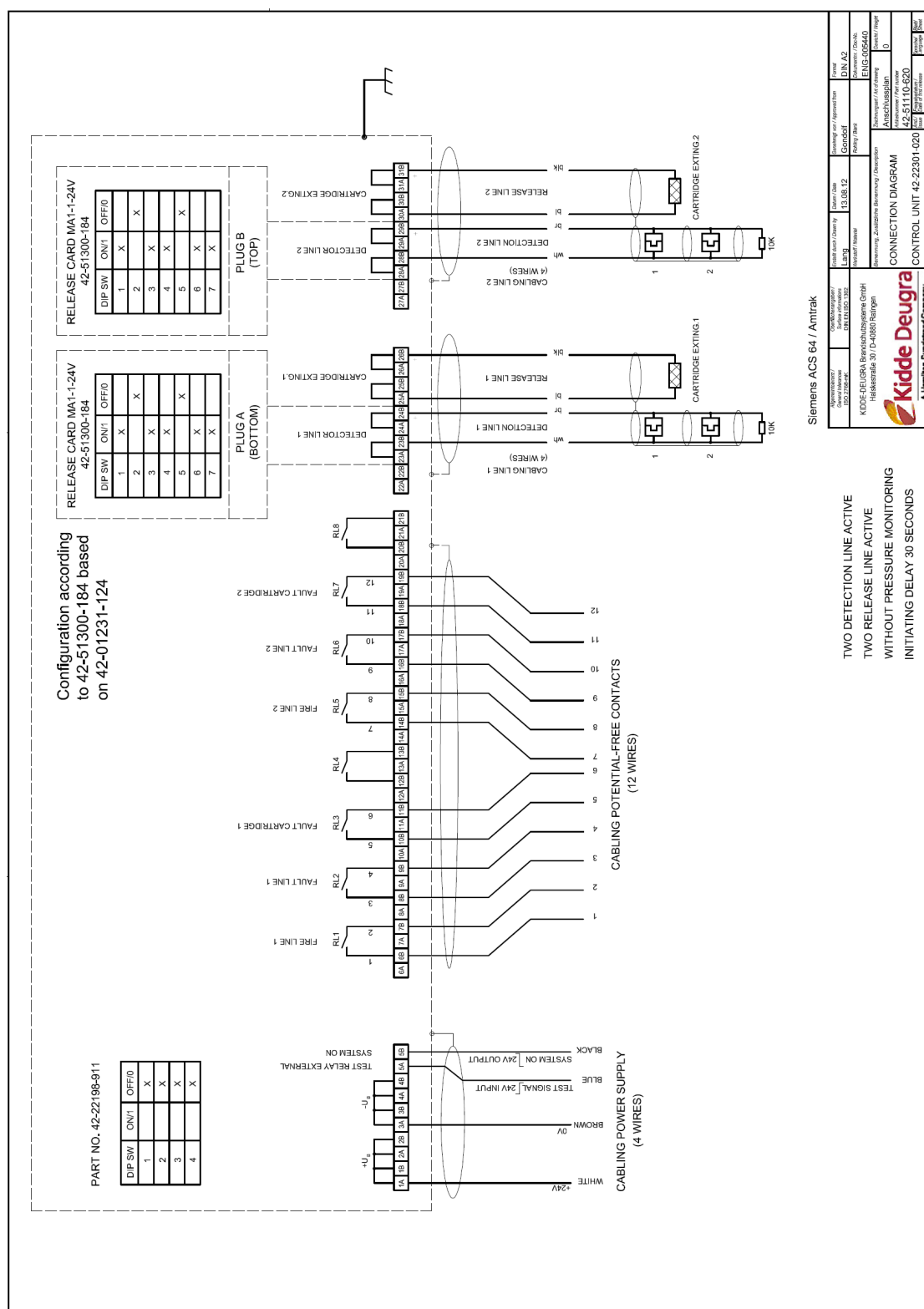
	Designation	Drawing number
15.1	24/2/2 control unit	42-22301-020(M)
15.2	24/2/2 control unit connection diagram	42-51110-620
15.3	Thermo switch, straight version	42-25044-900(M)
15.4	10 kΩ terminating resistor	42-41002-410(M)
15.5	Extinguishing cylinder 10 litre with Novec 1230	42-10016-110(M)
15.6	Bracket for the extinguishing cylinder	22-42941-253(M)
15.7	Hose	42-31031-138(M)
15.8	Adapter for hose	42-10465-115(M)
15.9	Nozzle M18x1.5	42-34035-018(M)
15.10	Pressurized gas generator, 400 mm	42-53110-240(M)
15.11	Wiring harness for pressurized gas generator	42-53110-106(M)
15.12	Handle for manual triggering	42-10465-113(M)
15.13	Test lamp for operational testing	42-43009-000(M)

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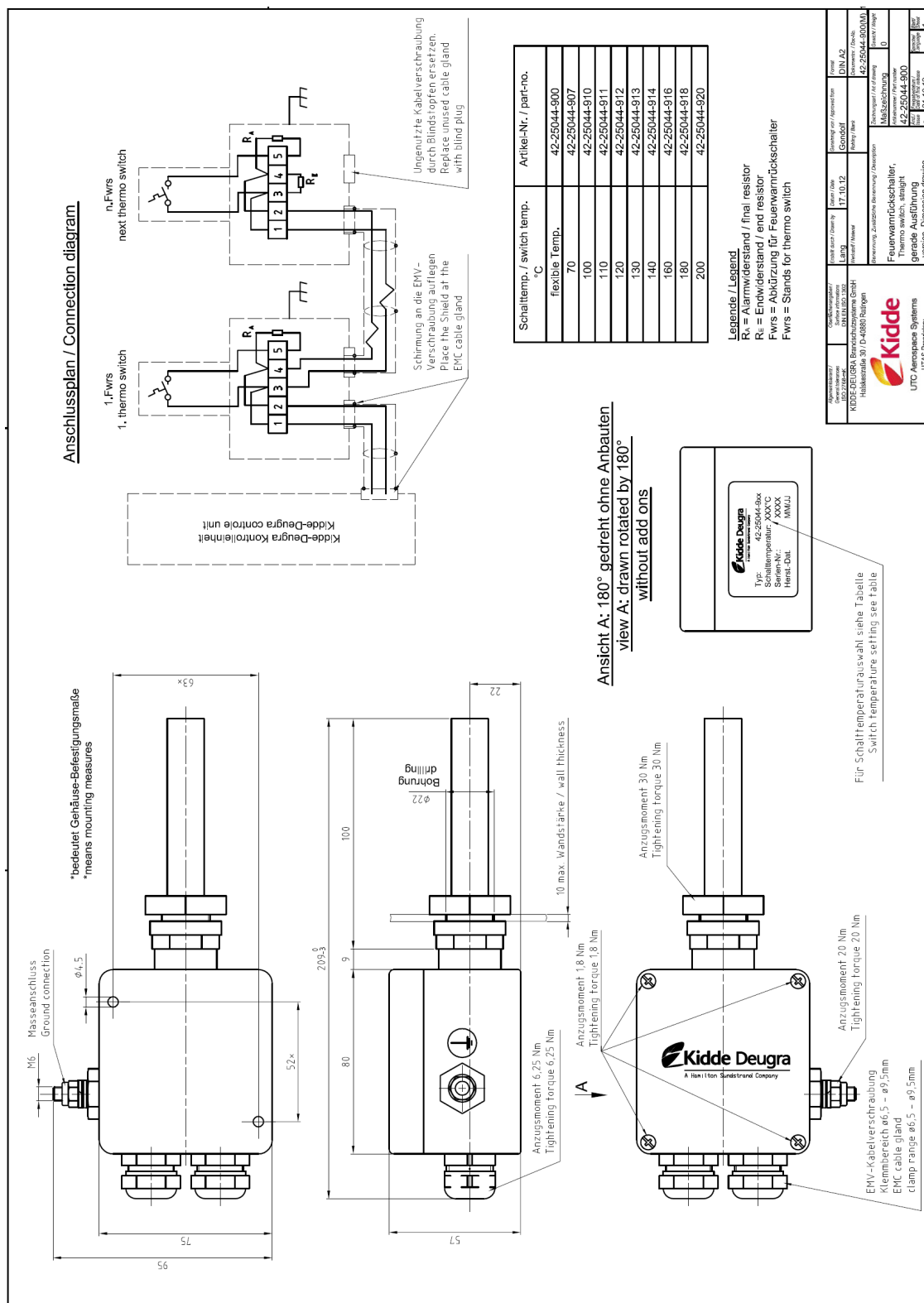
15.1 24/2/2 control unit



15.2 24/2/2 control unit connection diagram

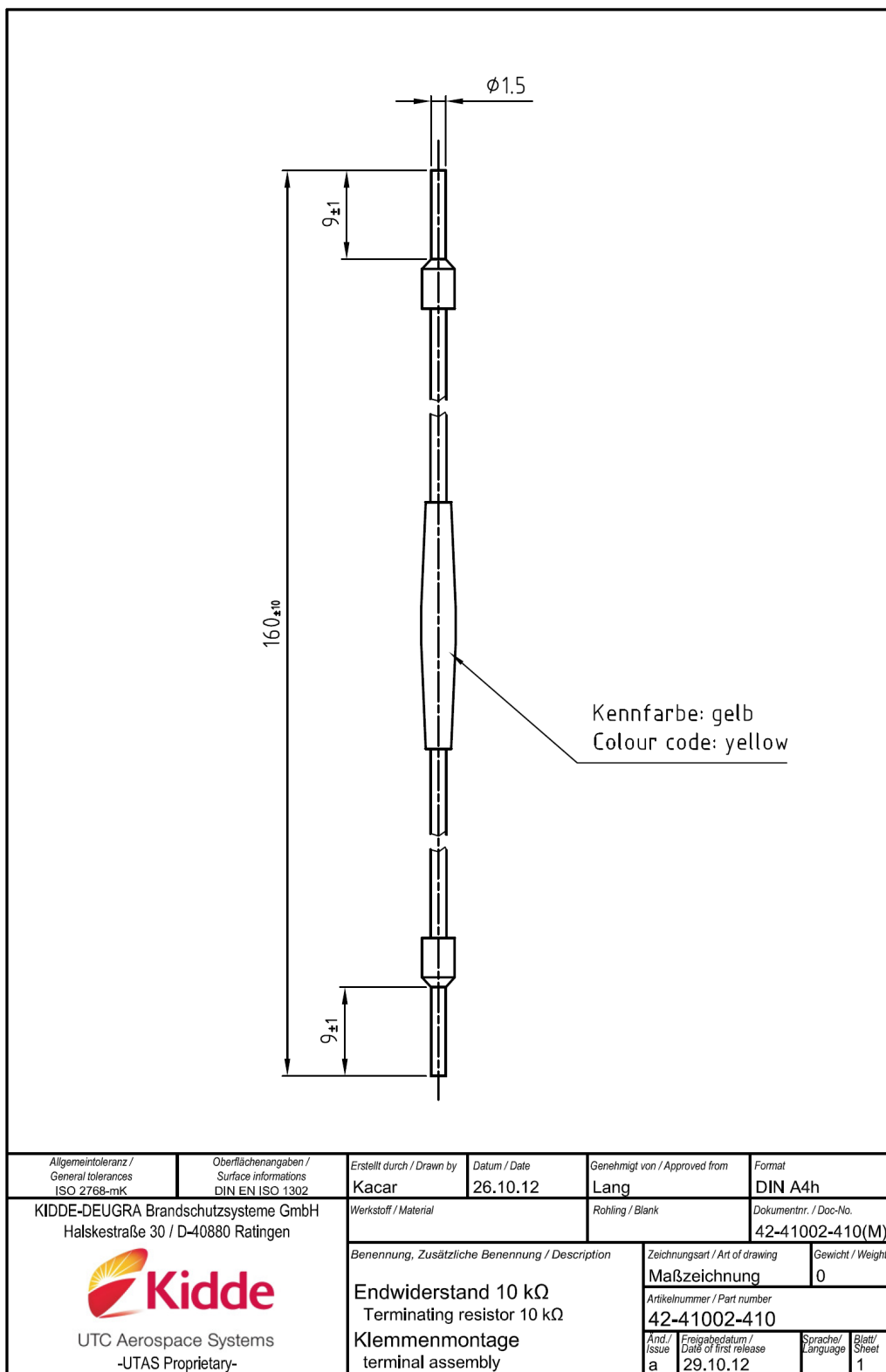


15.3 Thermo switch



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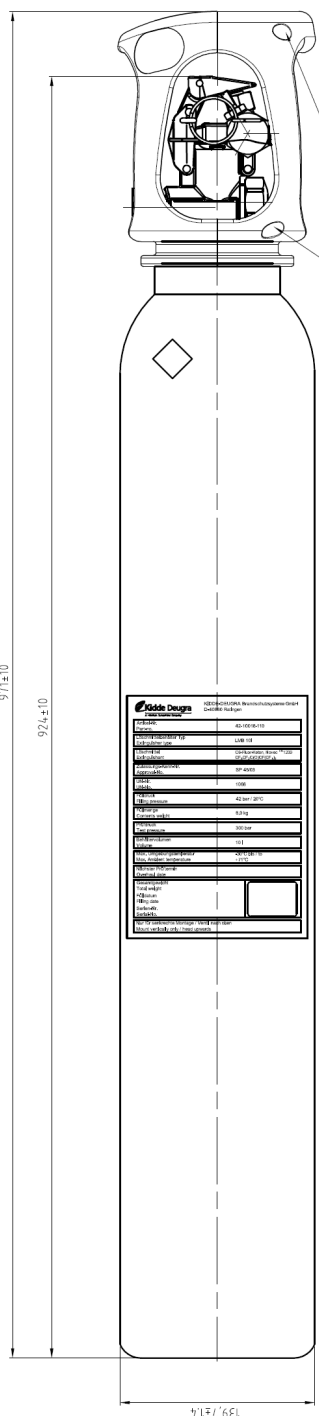
15.4 10 kΩ terminating resistor



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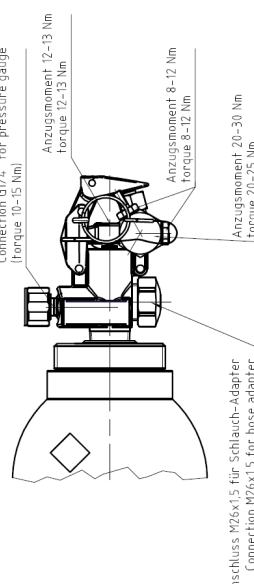
15.5 Extinguishing cylinder 10 litre with Novec 1230

Transportzustand (Ventil im gesicherten Zustand)
Transportation position (valve in secured position)



Fixierungsschrauben (Torx / T25)
Fixation screws (Torx / T25)

Ansicht ohne Transportsicherung, mit Anbauteilen (Ventil gesichert und im Wiegezustand)
View without protection guard (valve secured and in test weight condition)



Anschluss G1/4" für Manometer
(Anzugsmoment 10-15 Nm)
connected G1/4" for pressure gauge
(torque 10-15 Nm)

Anzugsmoment 12-13 Nm
torque 12-13 Nm

Anzugsmoment 8-12 Nm
torque 8-12 Nm

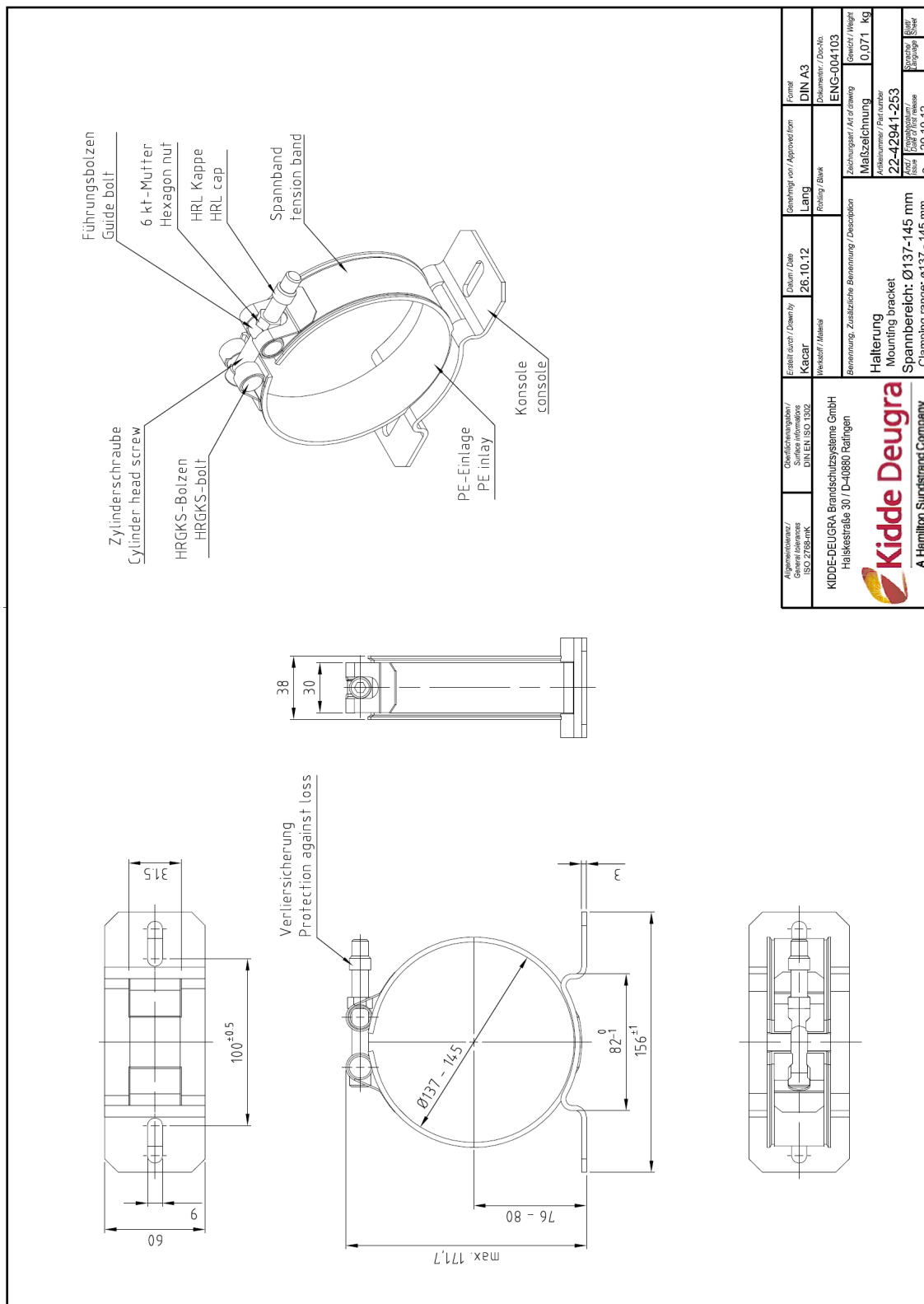
Anzugsmoment 20-25 Nm
torque 20-25 Nm

Anschluss M26x1.5 für Schlauch-Adapter
Connection M26x1.5 for hose adapter

Technische Daten:		Technical data:	
Behältervolumen:	10 l	Container volume:	10 l
Gesamtgewicht ohne Transportkappe jedoch mit Anbauteilen und Schutzkappe am Ventilauslass (Prüfgewicht):	19,5 kg ± 1,0 kg	Total weight (printed weight) with additional parts and protective cap on the valve outlet (test weight):	19,5 kg ± 1,0 kg
Löschmittel:	6,0 kg Novec 1230	Extinguishing agent:	6,0 kg Novec 1230
Fülldruck:	42 bar bei 20°C	Filling pressure:	42 bar at 20°C
Prüfdruck Behälter:	300 bar	Test pressure container:	300 bar
Prüfdruck Ventil:	150 bar	Test pressure valve:	150 bar
Umgebungstemperatur:	-30°C bis +71°C	Ambient temperature:	-30°C to +71°C
Behälterfarbe:	rot RAL 3000	Container colour:	red RAL 3000
Montagehinweise: Der Löschmittelbehälter darf nur mit dem Ventilkopf nach oben montiert werden. Die Transportsicherungen dürfen nur nach sicherem Einbau des Löschmittelbehälters in der Halterung entfernt werden. Vor dem Ausbau des Löschmittelbehälters aus der Halterung müssen die Transportsicherungen montiert sein.		Assembly instructions: The fire extinguisher may only be mounted vertically with the valve upwards. The transport safety devices may only be removed after the fire extinguisher has been safely fitted. The transport safety devices must be mounted before the fire extinguisher are be dismounted.	

Kidde KIDDE-DEUGRA Brandschutzsysteme GmbH Halskestr. 30 / D-40880 Ratingen Tel: +49(0)2102/405-0, Fax: +49(0)2102/405-151	UTAS Proprietary Stand Datum / Issue date 20.11.2012	Dok. Nr. / Document No. 01.10442.EN.COV.12.01	Seite / Page 59 / 67
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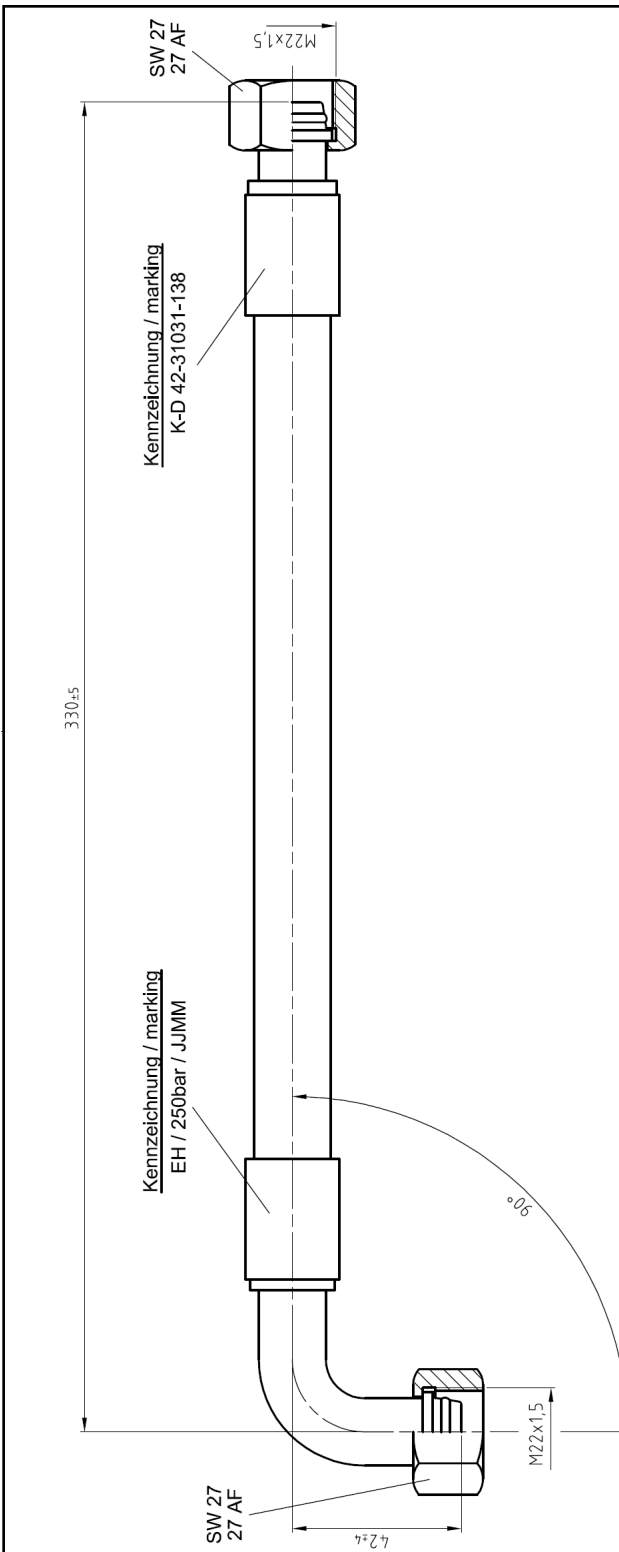
15.6 Bracket for the extinguishing cylinder



Allgemeine / General information ISO 2768-mS	Qualitätsmanagement / Surface information DIN EN ISO 1302	Erstellt durch / Drawn by Kacur	Datum / Date 26.10.12	Genehmigt von / Approved from Lang	Zeichnungsart / Art of drawing Zustimmung / Approval ENG-004103	Format DIN A3
KIDDE-DEUGRA Brandschutzsysteme GmbH Halskestr. 30 / D-40880 Ratingen			Material / Part number 22-42941-253			Gewicht / Weight 0,071 kg
 A Hamilton Sundstrand Company			Halterung Mounting bracket Spannbereich: Ø137-145 mm Clamping range: Ø137 - 145 mm			Zeichnung / Drawing 22-42941-253

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15.7 Hose



Technical data:

Operating pressure, max.: 250 bar

Test pressure: 375 bar

Temperature range: -40°C to +100°C

Evaluation of inflammability class for rail vehicles according to DIN 5510 part 2

Hose construction

Inner layer: NBR

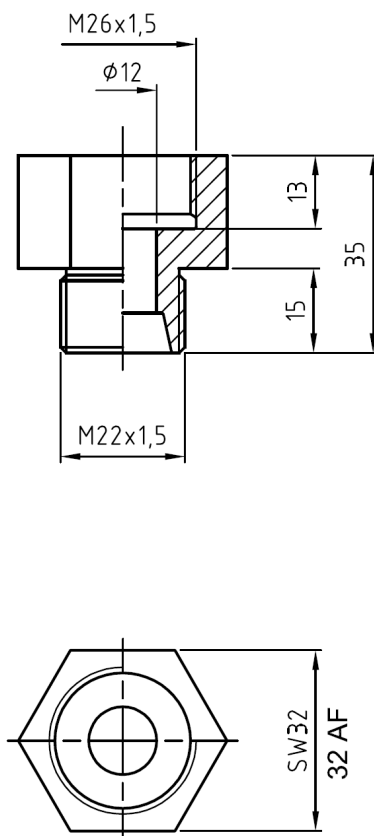
Reinforcement: wire mesh

Outer layer: CR

General information / ISO 21500-1:2018 KIDDE-DEUGRA Brandschutzsysteme GmbH Halskestraße 30 / D-40880 Ratingen	Approval / Date Kacur 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12
General information / ISO 21500-1:2018 KIDDE-DEUGRA Brandschutzsysteme GmbH Halskestraße 30 / D-40880 Ratingen	Approval / Date Kacur 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12	Approval / Date Lang 26.10.12

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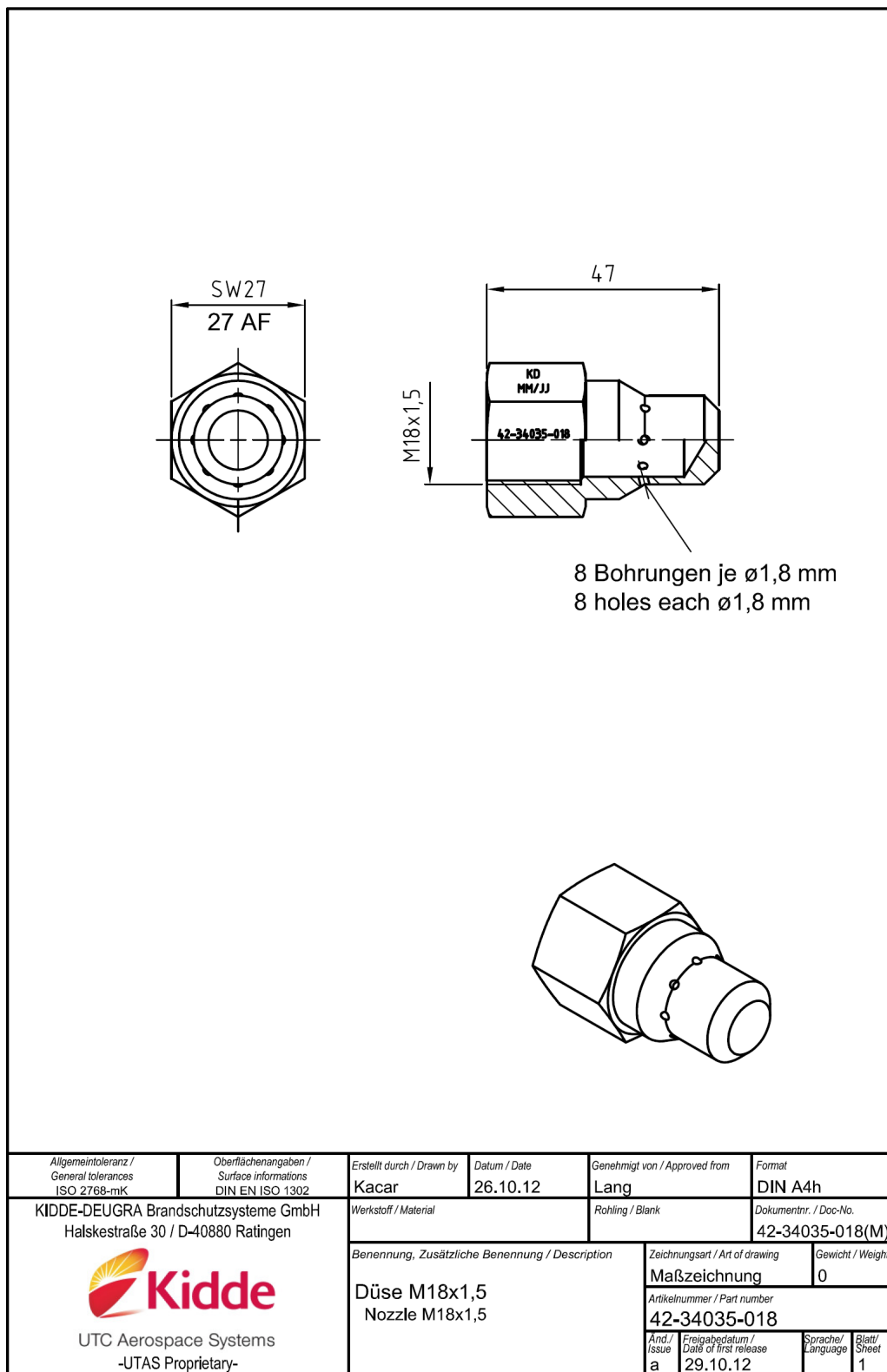
15.8 Adapter for hose



Allgemeintoleranz / General tolerances ISO 2768-mK	Oberflächenangaben / Surface informations DIN EN ISO 1302	Erstellt durch / Drawn by Kacar	Datum / Date 26.10.12	Genehmigt von / Approved from Lang	Format DIN A4h
KIDDE-DEUGRA Brandschutzsysteme GmbH Halskestraße 30 / D-40880 Ratingen		Werkstoff / Material CuZn 39 Pb 3	Rohling / Blank	Dokumentnr. / Doc-No. ENG-005512	
Benennung, Zusätzliche Benennung / Description Adapter Adapter M26x1,5 auf M22x1,5 M26x1,5 to M22x1,5		Zeichnungsart / Art of drawing Maßzeichnung		Gewicht / Weight 0	
Artikelnummer / Part number 42-10465-115		And./ Issue a		Freigabedatum / Date of first release 29.10.12	
Sprache/ Language		Blatt/ Sheet			

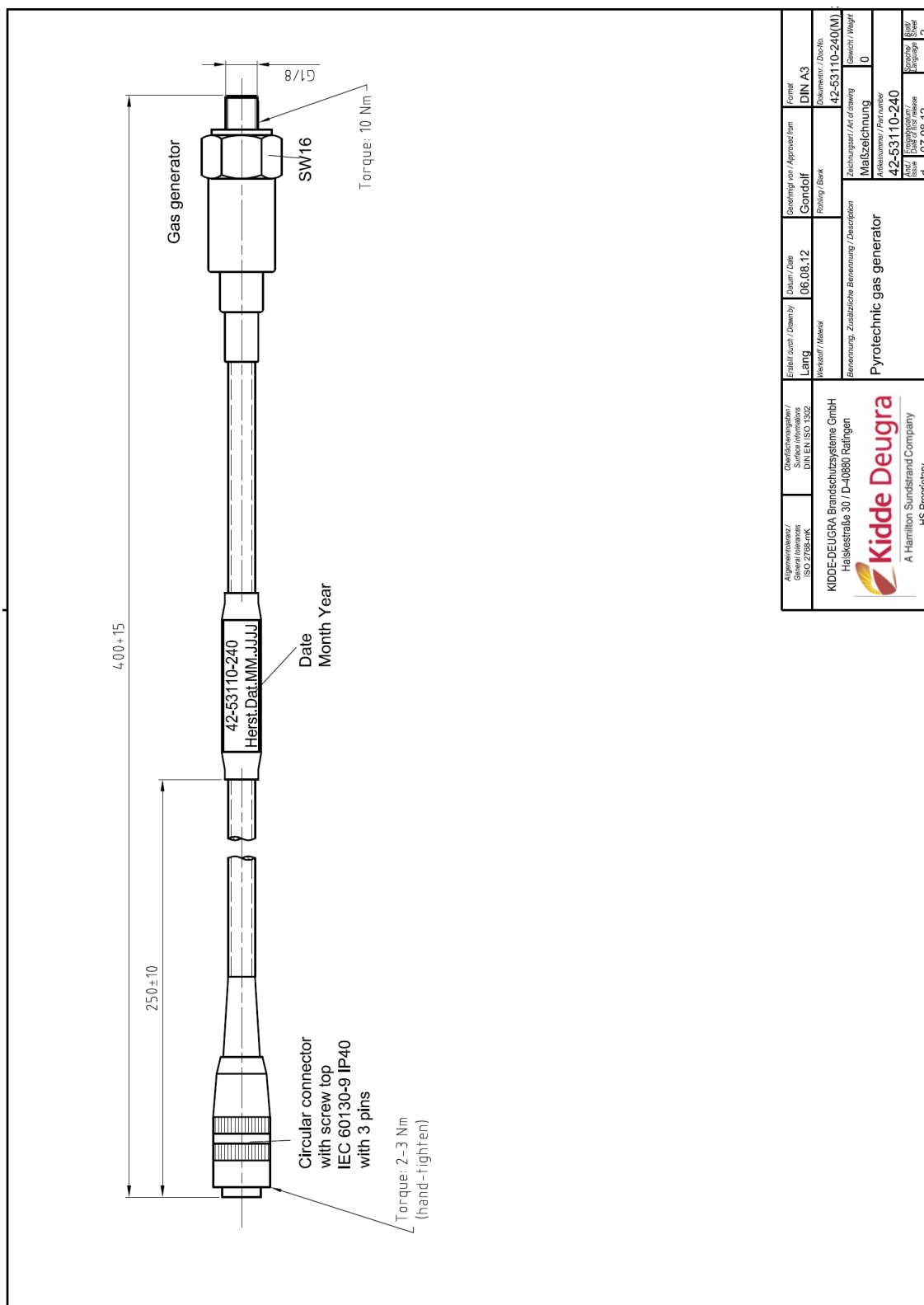
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15.9 Nozzle M18x1.5



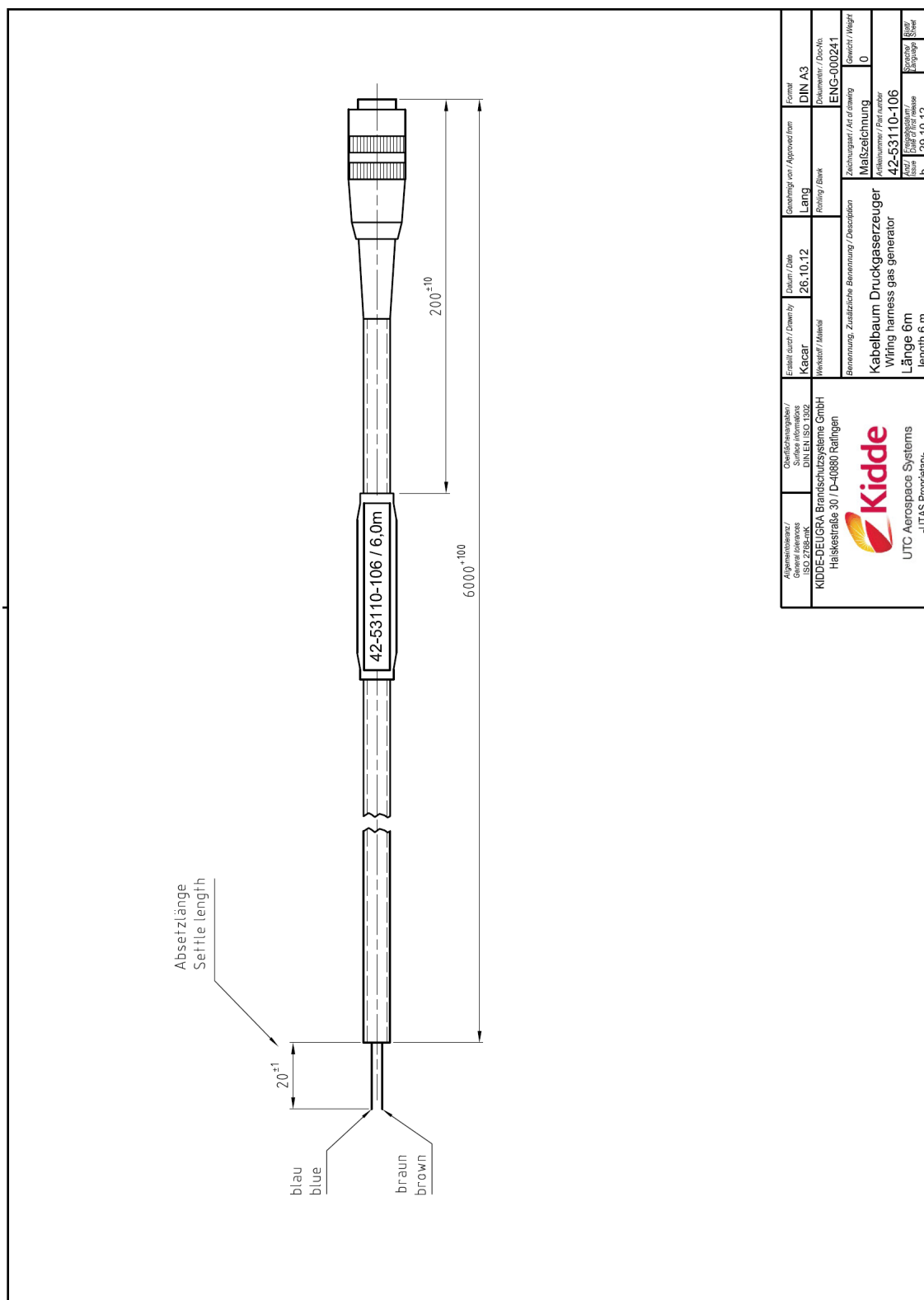
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15.10 Pressurized gas generator, 400 mm



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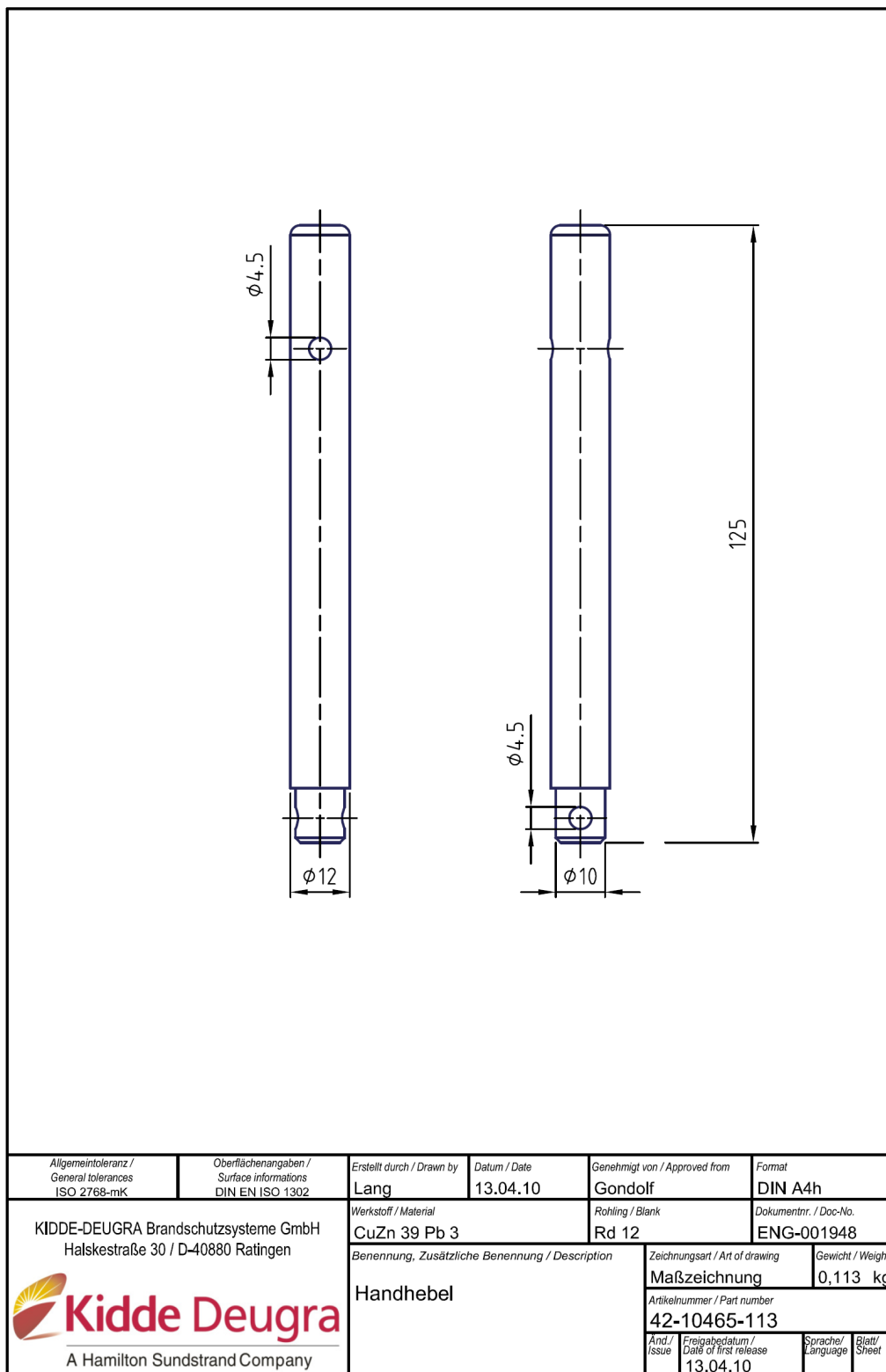
15.11 Wiring harness for pressurized gas generator



Approved by / General Information ISO 2768-mK	General Information / Surface Information DIN EN ISO 1302	Created by / Drawn by KACAR	Date 26.10.12	Reviewed by / Approved by Lang	Formal DIN A3
KIDDE-DEUGRA Brandschutzsysteme GmbH Halskestr. 30 / D-40880 Ratingen	KIDDE-DEUGRA Brandschutzsysteme GmbH Halskestr. 30 / D-40880 Ratingen	Material / Material Kabelbaum	Benennung, Zusätzliche Benennung / Description Kabelbaum Druckgaszerzeuger Wiring harness gas generator Länge 6m length 6 m	Zeichnungsart / Art of drawing Maßzeichnung 42-53110-106	Document / Doc-No. ENG-000241
 UTC Aerospace Systems -UTAS Proprietary-			Maßstab / Scale 1:1 Zeichnungsgröße / Drawing size 29.10.12		

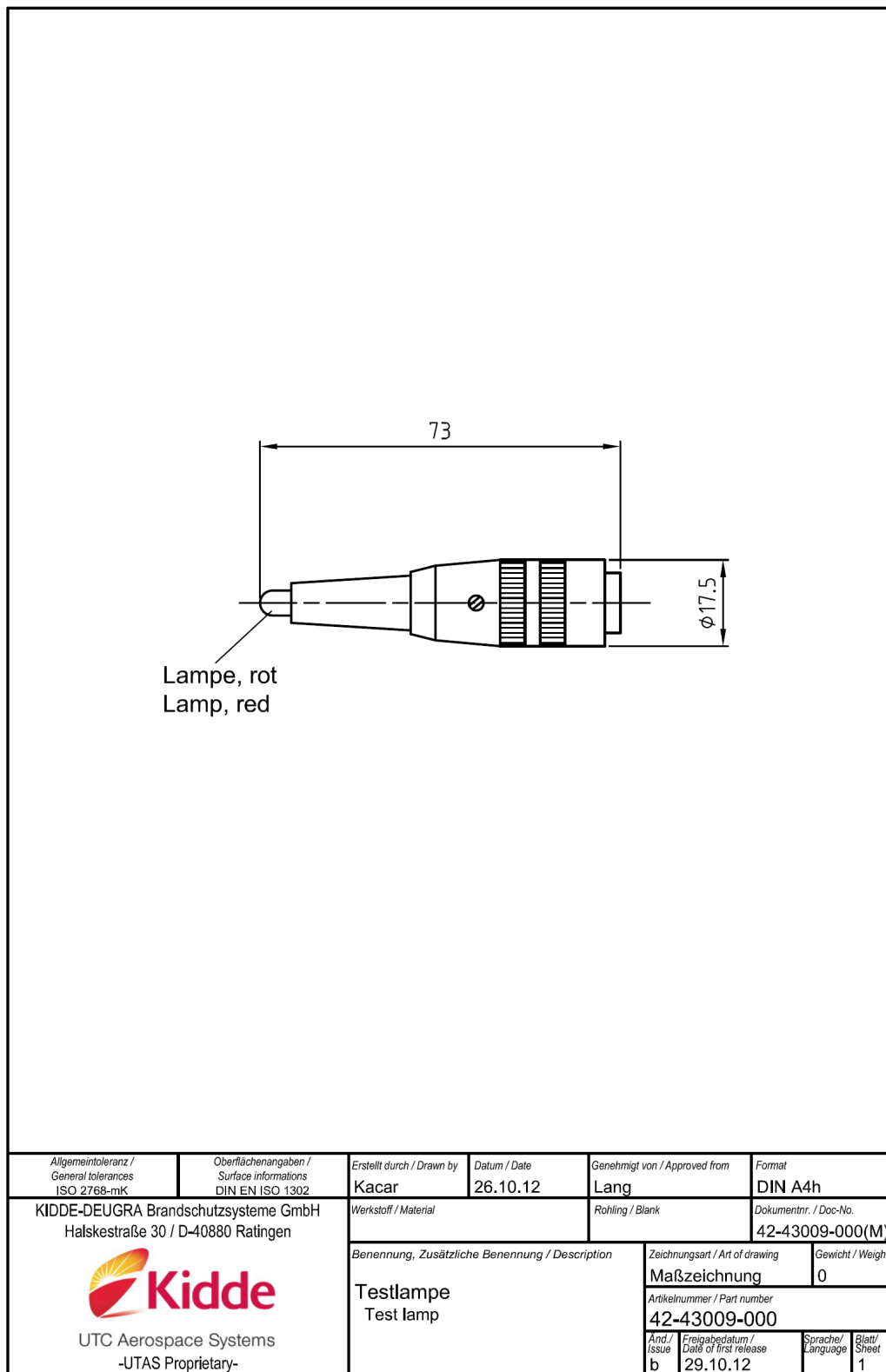
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15.12 Handle for manual triggering



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15.13 Test lamp for operational testing



Allgemeintoleranz / General tolerances ISO 2768-mK	Oberflächenangaben / Surface informations DIN EN ISO 1302	Erstellt durch / Drawn by Kacar	Datum / Date 26.10.12	Genehmigt von / Approved from Lang	Format DIN A4h
KIDDE-DEUGRA Brandschutzsysteme GmbH Halskestraße 30 / D-40880 Ratingen		Werkstoff / Material	Rohling / Blank	Dokumentnr. / Doc-No. 42-43009-000(M)	
 UTC Aerospace Systems -UTAS Proprietary-		Benennung, Zusätzliche Benennung / Description Testlampe Test lamp		Zeichnungsart / Art of drawing Maßzeichnung	Gewicht / Weight 0
				Artikelnummer / Part number 42-43009-000	
				And / Issue b	Freigabedatum / Date of first release 29.10.12
				Sprache / Language	Blatt / Sheet 1

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